ELECTRICAL REVIEW

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Cuts in Power Plant

Government's Disastrous Proposals

LAST week we commented on the preliminary announcement that the cuts in capital construction proposed by the Government would affect the provision of generating plant. In our leading article of October 3rd we gave our reasons for believing that the 10 million kW of new plant to be installed under the programmes of the Central Electricity Board (reported in the *Electrical Review* of September 19th) would be no more than enough to bring generating capacity up to maximum demand in 1952. Until then, periodic load-shedding appeared inevitable.

Industrial and Domestic Demand

So far the effect on the national load curve of staggering the industrial load has been disappointing. Although manufacturers seem to be making the required reductions in maximum demand, the consequent saving in kW has been lessened by a rise in the domestic demand, owing to some extent to actual or feared shortage of household coal but probably more to growing appreciation of the merits of electricity as a permanent feature in home economy.

Little reduction in demand can be anticipated as a direct result of the capital cuts. The decision to limit new Post Office contracts to old buildings, and telephone installations to those required for urgent purposes, will not help in this way. A reduction of 7½ per cent next year in steel allocations to shipyards (with their high load factors) cannot materially influence the total electrical position, while the declared intention to complete the well-advanced L.N.E.R. and Manchester-Sheffield railway electrification schemes and the agricultural programme will add to the electrical liability.

The figures given of kW capacity of power-station plant to be installed in 1948 and 1949 are not in close agreement with those given by the Central Electricity Board, and have possibly been adjusted in conformity with the actual situation as regards construction, which seems to be generally behind schedule. Allowing for carry-over, however, some falling short of the original programme up to 1950 is evident. It is the slashing of estimates for 1951 and 1952 that gives most cause for anxiety. Provision for 2,306 MW in the first of these years and for 1,617 MW in the second is whittled down to 1,500 MW apiece, making a shortage of over 900,000 kW for the last stage of the plant programme alone. Thereafter a flat 1,500 MW is to be added each year, which is no more than three-quarters of the average rate of growth of the electrical load which experience would suggest for that time.

Imperilling the Future

As it takes five years to build and equip a new power station and nearly as long to carry out a major extension of an existing one, under-estimates of electrical requirements cannot be made good without very serious delay. If the proposals to reduce generating plant are proceeded with, we fear that a continuance of load-shedding, even with staggered hours in industry, must be expected for an indefinite number of years. Departures from a standard of

reliability of electricity supply higher than that found abroad, in so far as they entail relatively minor inconveniences, must, we suppose, be accepted with other sacrifices in living conditions. The public may, however, unfairly hold electricity responsible for irregularities, or even blame the new administrative set-up, but that is a small matter compared with the disastrous effect on productive capacity of a shortage of electricity. That would defeat the whole object of the cuts in capital expenditure regarded as a corollary to the effort to increase exports as a means of retrieving national prosperity.

Industrial Research

EXPENDITURE by industry on research, which now stands at about £30 million per annum (or 0·66 per cent of the total value of British manufactures), is more than ten times what it was fifteen years ago—a figure that compares with £4·5 million spent by the Government on or in aid of industrial research. Further developments, which are projected by four-fifths of the manufacturing concerns in this country, are being held up through delays in building or in delivery of instruments and equipment. The new laboratories, which represent only a very small fraction of the building programme, can be expected to yield a return out of all proportion to their output, which justifies the claim of the F.B.I. for high priority for such schemes.

Rationing by Taxation

ONE day last week most of the national newspapers came out with a story that the Minister of Fuel and Power and the Chancellor of the Exchequer were considering a tax upon gas and electricity consumed in excess of stated amounts. This unanimity suggests "inspiration" from Government quarters which makes it necessary to issue another warning against this latest of a series of attempts to ration electricity and gas—for it would be a form of rationing. Individual allocations are again mentioned, but as we have pointed out on the previous occasions it is totally impossible to do this with any semblance of equity. Even Lord Beveridge's elaborate "points" scheme of 1942 would not achieve it. In any event the suggested tax would be iniquitous; those who could afford the extra charge would cheerfully bear it and those, whatever their circumstances, who found it necessary on account of illness or for other reasons to increase their consumption would be penalized.

Domestic and Industrial

ADVANCE statistics received from the Electricity Commissioners (reproduced on page 710) confirm that there is a tendency for the domestic electrical demand to grow at a greater rate than industrial consumption. Whereas in 1945-46 lighting, heating and cooking accounted for 39·0 per cent of the sales of energy and power applications for 56·5 per cent, in 1946-47 the respective proportions were 44·3 and 51·1 per cent. The tendency is encouraged by reasonable prices; there was actually a decrease from 1·524d. to 1·415d. in the average revenue per kWh for lighting, etc., although the power price went up from 0·873d. to 0·885d. per kWh. The increase in consumption for power purposes was astonishingly small—only just over 0·1 per cent; domestic sales went up by 26 per cent.

Codes of Practice

WHILE the electrical equipment of buildings is being dealt with in a number of Codes of Practice, as mentioned on page 688, these are in no sense opposed to the I.E.E. Wiring Regulations, first drawn up sixty-five years ago. Although non-mandatory, the latter are recognized as the ultimate authority in Great Britain in regard to fire and shock risks and on that account are cited in the Electricity Supply Regulations of the Commissioners. The Codes of Practice sometimes go further than the I.E.E. Wiring Regulations in encouraging improvements in detail, but these would not in any event permit practices that were inadmissible under the senior code.

A Practical Present

ONE of our advertisers has had the idea of presenting some of his overseas friends with a year's subscription to the *Electrical Review* as a Christmas gift. This is flattering to us and will we hope be very acceptable to the recipients. Those people on our home waiting list will wonder how this is possible when they cannot obtain the *Electrical Review*. The explanation is that we are allowed extra paper for printing copies for overseas circulation and we are therefore able to co-operate in this venture.

Highlands Load Building

1.—A Very Sparsely Populated Area

IN our last load-building series* we dealt with the activities in a section of the London area which, with one possible exception, namely, the heart of New York, is probably the most densely populated area in the world.

At the time of the preparation of the London load-building articles we conceived the idea of selecting for our next series, by way of contrast, the most sparsely populated area we could find adequately served with electricity. A brief survey revealed the area in Scotland of the Grampian Electricity Supply Company as the obvious subject, and we must acknowledge the whole-hearted co-operation of this company from the time of their decision, after careful consideration of our viewpoint, to agree to our request for facilities to conduct a thorough investigation of the policy, activities, achievements and prospects of the undertaking. In this respect we are particularly indebted to Mr. J. J. Cargill, manager, and members of his staff for their unstinting efforts at every stage to supply us with the particular information we desired.

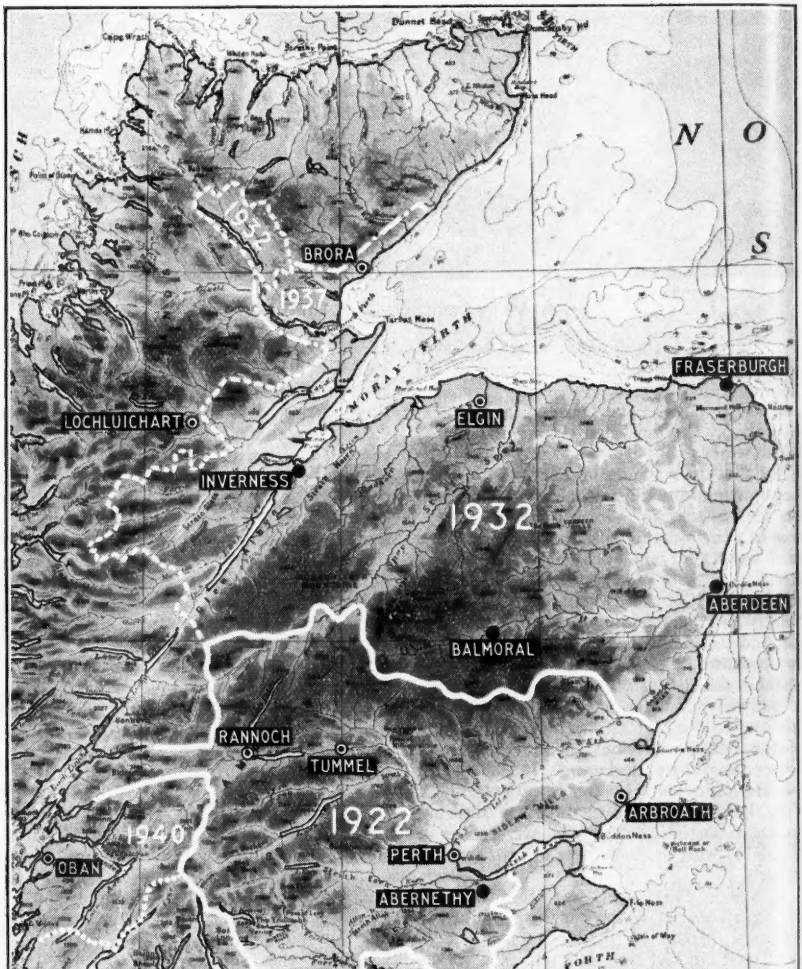
It was in 1931 when we last visited the Grampian district, which was then confined to the area defined by the Grampian Act of 1922, and we feel that our reference to the general policy of the undertaking can best be made by quoting a few extracts from the Cooper Report of 1942 on hydro-electric development in Scotland, relating particularly to the developments since that time.

"The initial area was successively extended in 1932, 1937 and 1940 until it now covers an area of over 10,000 sq miles, with a total population of about 414,000. A bulk supply contract originally concluded with the Fife Electric Power Co. and the Scottish Central Electric Co. was taken over by the Central Electricity Board following the creation of the Central Scotland District. This contract, which provided for a supply of 105 million kWh per annum, gave the Grampian Co. an assured market upon which to build, and so enabled the company to embark upon the undoubtedly difficult and hazardous enterprise of giving public supplies in an extensive and sparsely populated territory. By the end of 1940 about 20 per cent of the premises in the area had been connected, the total number of consumers, apart from bulk supplies, being over 22,000. The kWh sold in 1940 was 63 million, in addition to the 105 million supplied to the C.E.B., and the average revenue obtained from the 63 million kWh was 1·55d. per kWh. The total capital expenditure incurred by the company was £6 million. The net revenue, after deducting works costs and depreciation, but before allowing for income tax, has averaged over the whole period of the Grampian Co.'s existence a little over 3½ per cent. Disregarding the initial years when the return was negligible, the average return on the capital employed over the ten years 1930 to 1940 has been only 3·8 per cent. It is plain that if this £6 million development had been carried out over these years by a non-profit

*London Load Building I—V. *Electrical Review*, January 3rd and 24th, February 7th, April 4th and 25th, 1947.

earning public corporation the money could not have been raised on these terms without some form of guarantee."

Actually no assistance, financial or otherwise, has been obtained by the company from any Government Department or local authority, while a point of the greatest bearing in the light of the position of the undertaking

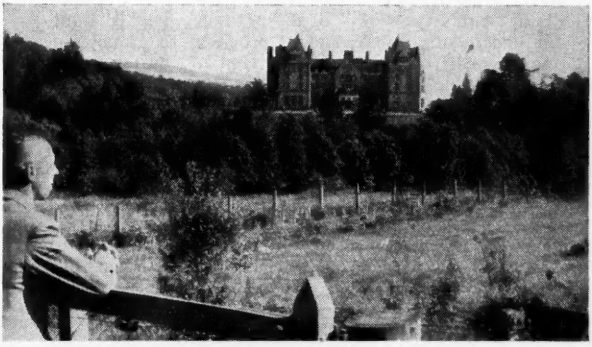


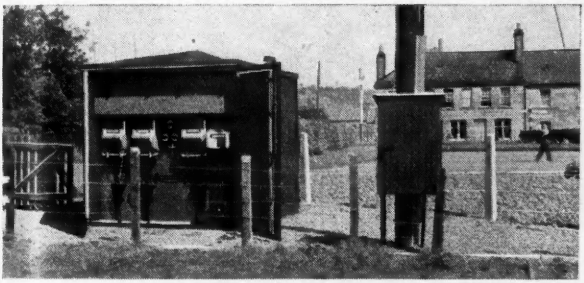
Our present load-building survey relates to the 10,000 sq-mile Scottish Highlands area which includes some of the most sparsely populated districts and a terrain which presents the greatest physical difficulties

to-day is that the building of the major generating stations was carried out in the midst of the "economic blizzard" of 1929–34.

The main generating plant owned by the company is situated at Rannoch and Tummel, the stations having respective capacities of 48 and 34 MW. Auxiliary stations, hydro, steam and oil, have either been erected by the company or acquired from other undertakings now receiving bulk supplies, and are used during peak-load periods. The maximum load which can be supplied from the generating plants is restricted to 80 MW owing to the design of the pipe lines and waterways to ensure the economic utilization of water from the various catchment sections. As the absorption of this plant capacity was foreseen some years ago, powers were then sought to proceed with further hydro developments. This led to the "Affric" inquiry in 1940, and the Cooper Report which followed fully substantiated the claims of the company.

It was, however, decided by the Government that it was desirable to undertake more comprehensive water development in Scotland, and the power to carry it out was finally vested in the North of Scotland Hydro-Electric Board, upon whom the company is now urgently dependent for all further supplies of electricity. Meanwhile the system load has now greatly exceeded the generating plant capacity, and the various plants have for some time been running under load conditions much more severe than was originally contemplated. It is a testimonial to the soundness of design and construction that the plant has continued to operate satisfactorily, with no more than the usual outages for repairs and maintenance. Balfour Beatty & Co., Ltd., have been responsible for the design and construction of the whole development on both the generation and distribution sides.





Pitlochry may be regarded as a centre of Scotland's tourist industry; the picture above shows the Atholl Palace Hotel. Left: At Bridge of Earn we saw a typical kiosk substation for a village supply

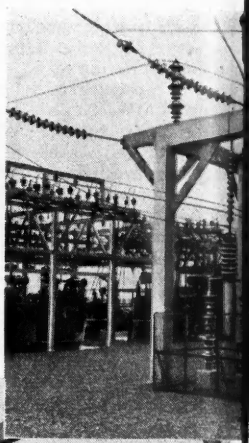
	1930	1946
Capital expenditure	£1,830,862	£7,559,900
Generating station capacity	23,635 kW	97,751 kW
Load connected	24,000 kW	176,715 kW
Maximum demand	14,511 kW	80,000 kW
Average cost of coal per ton	15/8	46/4
Gross revenue	£32,998	£963,155
Units sold	7,934,483	273,576,383
" excluding sales to C.E.B.	3,597,083	188,507,778
" excluding all bulk supplies	1,169,610	112,626,276
Revenue from sale of electricity	£32,643	£952,608
" excluding sales to C.E.B.	£25,956	£876,634
" excluding all bulk supplies	£15,340	£638,028
Average price per unit sold	0·99d.	0·84d.
" excluding sales to C.E.B.	1·73d.	1·12d.
" excluding all bulk supplies	3·16d.	1·36d.
Number of consumers	1,653	39,750
Mileage of mains	212	2,763

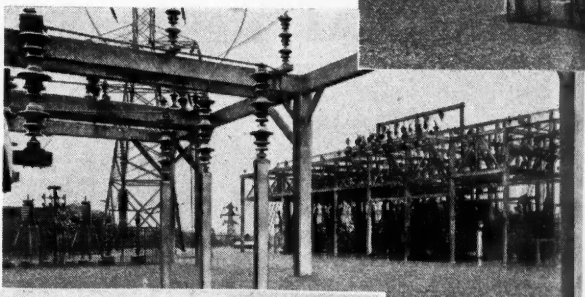
When considering the policy of the undertaking, then, it should be borne in mind that eventually the undertaking is destined to be transferred to the North of Scotland Hydro-Electric Board which will be responsible for generation, transmission and distribution.

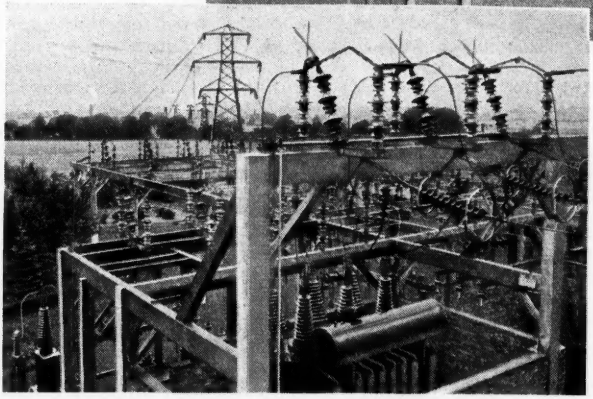
The table on page 685 will probably give the best "bird's eye view" of the position of the undertaking to-day, and its progress during the years of its development, but it is our deliberate intention to use as few statistics as possible.

The population ratio already indicated, i.e., 41 in one square mile, is, we believe, almost, if not the lowest figure for any undertaking in this country, but even so, the ratio is not truly representative because very large divisions of the major area, each comparable in size with the areas of many other supply undertakings and adequately covered with distribution lines, have a population ratio very much lower than that of the whole area of the undertaking.

In our earlier post-war load-building articles it has been possible for us to classify certain major types of load in terms of the areas in which the particular loads are supplied. This is not possible in the Highlands where, with a few minor exceptions, such as the fishing industry, all types of load are thoroughly dispersed and intermingled. Largely for this reason, and also because of the unique opportunities afforded by an extensive tour throughout such a large area where one is stimulated not only by the natural grandeur of Scotland, but more so by an enthusiasm of the staff unique in our experience, we have decided that to present our impressions by way of a description of our tour will, in this case, give a better cross section of the load-building interest in the area than our recently adopted method of publishing separate accounts of the generation, transmission and distribution backgrounds to the final commercial story.



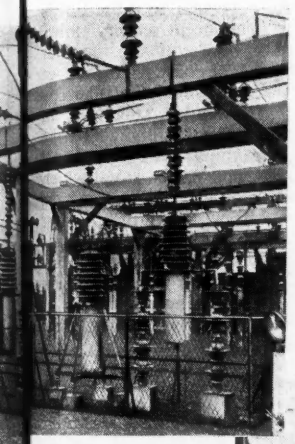


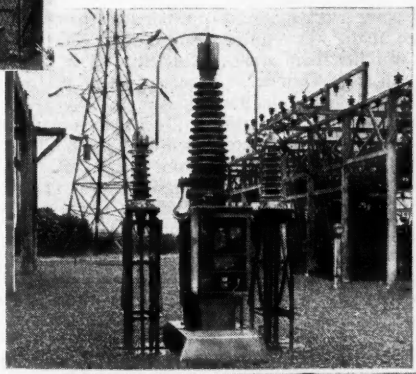


Abernethy substation is the major point of the transmission system in the 1922 Act area. Above: Outgoing Tummel line from ground level showing 33-kV substation on right. Left: Looking over the main 20,000-kV transformers to the double-circuit 132-kV line in rear.

After the necessary introductions and final

checking of the arrangements for our investigation at the company's headquarters at Perth we set out for Abernethy, a few miles south-east of Perth, which was the starting point of our 790-mile circular tour from Abernethy, returning via Rannoch in the west, Inverness in the north, Fraserburgh in the north-east, Balmoral in the centre and Arbroath in the south-east. Abernethy made an excellent starting point for a reason other than the geographical one. It is the major point of the transmission system in the 1922 Act area, and it is the point at which energy is exported to the C.E.B. Supply from the generating stations at Rannoch and Tummel in the west is transmitted to Abernethy by a duplicate 132-kV steel-tower line with 37/0·110 s.c.a. conductors. Connection to the C.E.B. system is made through four 20-MVA three-winding star/delta/star-connected transformers with a ratio of 125/33/132 kV. The neutral point of each 125-kV winding is connected to a capacitance bushing which comprises a special condenser unit and low-voltage transformer, together with a relay. Operation of the relay trips the appropriate circuit breaker on the occurrence of an earth fault, so that the faulty 132-kV line is cleared with the minimum system disturbance. The 33-kV tertiary windings provide supplies to the important 33-kV substation and five outgoing overhead lines. The transformers are banked in pairs controlled by two 132-kV oil circuit breakers. The 33-kV outdoor substation has duplicate bus-bars and selector switches, while B.T.H. 500-MVA circuit breakers control the supplies from the transformers and to the outgoing feeders. Star/open-delta/star step-down transformers provide an earthed point for the 33-kV system, as well as 440-V auxiliary and local supplies.





Above : Capacitance bushings ; right, carrier current equipment ; below, control room at Abernethy

Abernethy substation forms an important link in the carrier current communication network, and the private automatic exchange links the Tummel hydro-electric station with the grid control room in Glasgow and the undertaking's headquarters and thermal power station at Perth. Further, the carrier-current system provides valuable supervisory control facilities between Tummel and Abernethy. These include operation and indication of all circuit breakers and voltage regulators, meter

indications and telephony. Should a circuit breaker trip on fault a signal would be sent back to Tummel and an alarm brought in and the appropriate indication given on the control desk.

Two major outgoing feeders from Abernethy are one running N.W. to Perth and one running N.E. to a point near Errol. These two lines may be regarded as central back-up points for an extensive 11-kV network in the southern part of the areas of supply, which extends roughly to Loch Earn in the west, via Crieff; to Laurencekirk in the north-east, via Arbroath; and to Pitlochry in the north, via Dunkeld. The area served by this network includes a belt of lower lying ground bordered by the River and Firth of Tay and the sea coast up to a little beyond Montrose. It is rich in both industry and agriculture, a fact which became evident at a later stage in the tour.

Other places at which this network is braced by the 33-kV system are at the west end of Loch Earn at a point on the main transmission line running south from Tummel to Callander; at a point near Pitlochry on the main transmission line from Tummel to Forfar in the east; at Rattray where there is a spur line from the Tummel-Forfar line at a point almost midway between Pitlochry and Forfar; and at Friocheim in the east which is the terminus of the 33-kV Forfar line.

Pitlochry, by the way, may be regarded as a centre of Scotland's valuable tourist industry represented electrically by the hotel load. We refer in particular to those hotels in the districts of magnificent scenery rather than to the many hotels at the popular seaside resorts around the coast. Throughout the whole area there are something like 650 hotels supplied by the undertaking with an estimated consumption of something like 5,500,000 kWh per annum. A typical hotel at Pitlochry is the Atholl Palace Hotel which has 133 bedrooms and 46 acres of grounds. It is, however, only one of a large number of hotels in the town which, as a whole, has a maximum demand of 448 kW and a consumption of 1,380,000 kWh per year by a total of 454 consumers. The population of Pitlochry is about 2,000.

From Abernethy we proceeded to Perth, via Bridge of Earn, where we saw a typical installation for a village supply. It is a kiosk substation with 50 kW of transformer capacity. The maximum demand on this substation at the moment is approximately 45 kW.

The village population is about 500, and the consumers 90. The substation is served from an 11-kV line running south and supplying an 11-kV network serving the Kinross County area, mainly for the agricultural load, but which includes woollen mills in Kinness.

Good Wiring Practice

Consideration of New Codes

THE Codes of Practice Committee for the Electrical Equipment of Buildings (convened by the Council of the I.E.E. on behalf of the independent Codes of Practice Committee) has so far undertaken work on twenty-six Codes relating to electrical installation practice, of which eleven have been promulgated as drafts for comment.

The procedure is that the Committee appoints a sub-committee of qualified members to prepare a draft Code for submission to the Committee, which considers the relationship of its clauses to other electrical Codes. The draft Code, embodying any amendments, is then transmitted to the Engineering Services Sectional Committee of the independent Codes of Practice Committee, which scrutinizes the draft in its relation to other Codes dealing with engineering services in buildings. The Code, with any further amendments, is then printed by the British Standards Institution as a draft for comment within forty days.

The I.E.E. has recently undertaken the collation of the comments, which are next reviewed by the original sub-committee, and amendments are introduced to give effect to accepted comments. The amended Code with the note of action taken on the comments received then goes successively before the Electrical Code Committee and the Engineering Services Sectional Committee, which may recommend to the independent Codes of Practice Committee publication in final form as a British Standard Code of Practice.

Authority for final publication by the B.S.I. has already been given in respect of the Code (Ref.: 322.101)—Provision of Electricity Service Cables for Small Houses—and is likely to be forthcoming shortly for Codes dealing with private electrical generating plant, provision of electric light in dwellings and the installation of vapour-compression domestic electric refrigerators. Consideration of comments received is proceeding on seven Codes; among them are the choice, installation and maintenance of electric wiring systems (for power, lighting or heating circuits) in buildings, and electrical installations (general).

B.E.A. Appointments

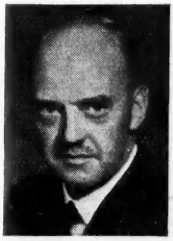
Mr. Pask to be Chief Engineer

THE British Electricity Authority has announced a number of further appointments. Mr. V. A. Pask, M.I.E.E., M.I.Mech.E., is to be chief engineer; Mr. J. D. Peattie, B.Sc., A.C.G.I., M.I.E.E., deputy chief engineer (transmission); Mr. R. R. Martindale, A.M.I.E.E., M.Inst.F., deputy chief engineer (generation); Mr. H. Nimmo, M.Inst.C.E., M.I.E.E., M.I.Mech.E., area liaison controller; and Mr. R. A. Finn, solicitor and chief legal adviser.

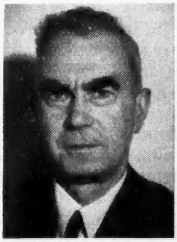
Mr. V. A. Pask

Mr. Pask is fifty-two. He received his early education and engineering training at Preston and held appointments at Paisley, Hull and Bootle before becoming deputy general manager and engineer of the Newcastle and District electricity undertaking. Then for eight years he was city electrical engineer of Norwich. He joined the C.E.B. in 1940 as district manager for Mid-East England and four years later became manager in North-East England when the two areas were combined for administrative purposes. At the end of 1945 he went to head office as personal assistant to the general manager and has lately been engaged in special duties with the Board.

Mr. Martindale is chief operating engineer and executive assistant to the engineer-in-chief of the London Power Co. He is fifty-four and was educated at Rutherford and Armstrong Colleges. After training at J. H. Holmes and the Wallsend Slipway, he joined the Tynemouth Electricity Department and later served with the Cleveland & Durham Power Co. and at the Deptford station of the London Electric Supply Corporation.

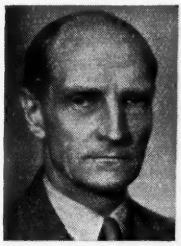


Mr. R. R. Martindale



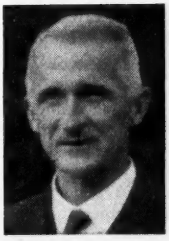
Mr. J. D. Peattie

Mr. Peattie is fifty-seven. He was educated in Dundee and at the City and Guilds of London College, gaining the B.Sc. degree in engineering with first-class honours. For three years before 1914 he was with Siemens-Schuckertwerke, Berlin, and during the 1914-18 war served with the Royal Naval Division. He subsequently held appointments with Metropolitan-Vickers, Edmiston Brown & Co., and Manchester Electricity Department. He joined the C.E.B. in 1929 as chief operation engineer and was appointed deputy chief engineer in 1944.



Mr. H. Nimmo

Mr. Nimmo became the chief engineering inspector to the Electricity Commission in 1929, and in 1945 succeeded the late Sir Leonard Pearce as an Electricity Commissioner. Before joining the Commission he was electrical inspector to the Government of Burma. He is president of the Association of Supervising Electrical Engineers. Mr. Nimmo will continue to act as part-time Commissioner until the Commission is formally dissolved.



Mr. R. A. Finn

Mr. Finn is forty-seven years of age and has been a partner in the firm of Sydney Morse & Co. for the past fourteen years. He has had considerable experience of legal work for the supply industry.

The Authority has yet to appoint a deputy chief engineer for research.

Science in the U.S.S.R.

FIRST detailed picture of the role of Soviet science under the new Five-Year Plan is to be given by Prof. J. D. Bernal at Caxton Hall on November 12th. The occasion is a symposium on "Science and the Soviet State," in honour of the thirtieth anniversary of the U.S.S.R. The chairman will be Sir Robert Watson-Watt, and speakers will include Prof. V. Gordon Childe, Mr. A. Rothstein, Mr. Ben Parkin, M.P., and Mr. Geoffrey Bing, M.P. Tickets (2s. 6d. each) may be obtained from the Society for Cultural Relations with the U.S.S.R., 14, Kensington Square, W.8.

Views on the News

Reflections on Current Topics

THE incidence of "Poppy Day" tomorrow (Saturday) adds interest to an announcement by the British Legion that it has just started up an auxiliary power plant at its Richmond poppy factory. This is a Canadian Russel-Hipwell 6-cylinder diesel driving a 230/400-V three-phase alternator, originally 31 kW, re-wound to provide an output of 25 kW. The plant is expected to take over one-third of the normal load on the mains and to safeguard the factory, which employs nearly 400 war-disabled men, against stoppages.

* * *

A forceful method of impressing upon the public the urgent need for electricity economy was adopted recently at Nottingham by the Senior Regional Officer of the Ministry of Fuel and Power. From the feminine point of view the fact that the use of a "one-bar" electric fire for an hour at peak times meant a loss of four pairs of fully-fashioned silk stockings was impressive. He told the men that the cutting-off of electric power for an hour would mean 10,000 fewer bottles of beer from Nottingham breweries.

* * *

The movement of municipalities towards the supply and servicing of radio sets which began in London has spread to the provinces. In a letter in the *Coventry Evening Telegraph* the writer mentions that the Electricity Department is enclosing a leaflet with its accounts suggesting that consumers should send their sets to the Department for repair or if they are "worn out" purchase a new "Civic Concord" set from the Department. The comment is made that it would be interesting to know the reaction of a radio retailer receiving the leaflet and it is suggested that "Civic Concord" is not exactly descriptive.

* * *

I told an American friend the other day that the *Electrical Review* was the oldest existing electrical journal. He said that in that case he was surprised to find another paper claiming that distinction. This revived an old controversy which I thought had been settled years ago. The *Review* was founded in 1872; the other journal in 1878. Then how did the latter's claim arise? Well, for a few years in the early 'sixties of last century there was a paper of the same name. This ceased publication in 1864; the journal founded in 1878 took its title but had no other connection with it. All this was explained by Desmond G. Fitzgerald in a letter to the Editor of the *Western Electrician* (Chicago) in 1897, reproduced in the Jubilee issue of the *Electrical Review* in 1922. Fitzgerald was the editor of the original journal, founded by Sir John Pender, and was therefore in a position to know the facts. How the hiatus of fourteen years can be bridged so as to entitle the *Electrician* to claim direct descent from 1861 is a question which I must leave to others to answer.

* * *

If Mr. Leslie Knapp, technical adviser to the Cinema Exhibitors' Association, has his facts right he discloses a strange situation in the cinema world. According to *The Cinema*, he says:—"Where motor generators were used they were regarded as machinery and came under power rate. Where rectifiers have replaced generators the authorities say, 'These are not pieces of machinery and we must charge you lighting rate.' It is a most difficult problem." I agree. It is conceivable that rectifiers might be used for lighting purposes, but not by anyone of sound mind. If other supply undertakings followed the lead of Mr. Knapp's "authorities" it would prove very expensive for some consumers.

* * *

In another kindred paper, *To-Day's Cinema*, I read that the chairman of the Leeds branch of the C.E.A., said in a discussion on the "Electricity Bill," that exhibitors would have to spend money in the next few years on changes. For example, they would have to bring wiring up to the full state of efficiency, demanded by the authorities and fire insurance companies. "The Association had taken exception to these proposals. If, however, they were going to show some appreciation of safety factors they must accept that some of the requirements were justified." I do not know to what section of the Act the speaker was referring. The British Electricity Authority certainly has power to make and enforce regulations under Section 60, but I cannot find anything specifically about cinemas.—**REFLECTOR.**

Electricity in Westmorland

System Protection Arrangements

IN his address as chairman of the North-Eastern Centre of the Institution of Electrical Engineers, COL. G. G. MALLINSON (Johnson & Phillips, Ltd.) first referred to Tyneside engineering achievements, including by way of example some details of the Parsons-Reyrolle turbo-electric propelling machinery in Canadian Pacific ships (see *Electrical Review*, April 12th and November 22, 1946).

Col. Mallinson then gave particulars of the rural area served by the Westmorland & District Electricity Supply Co., of which he is a director. His object was to indicate that in a "very thin" area electricity could be made available at a reasonable price.

The area of 700 square miles had a population of 47,000, or 67·2 people per sq mile, which was little more than half the average of all other rural districts in Britain. Nine 11-kV overhead lines on 22-kV insulators formed two ring mains, north from Clifton Cross and south from Kendal, interconnectors and radial feeders being added as required by growth of load.

The northern portion of the area being subject to lightning storms, a continuous earth wire had been provided over the conductors. During the last few years trouble had been caused by excessive numbers of migratory birds perching on the earth wire, which was dragged down to conductor level. In the southern portion of the area the continuous earth wire was carried under the conductors.

Many of the overhead lines had been unobtrusively routed through very beautiful country in the Lakes District.

Because of the nature of the country, faults were constantly caused by birds, obstruction by tree branches carried by the wind and insulators flashing over during thunderstorms.

System protection included solenoid auto-reclosing circuit breakers in the main feeder circuits and the C.E.B. had allowed Petersen coil arc suppression in the south, but not in the north where another authority obtained its supply from the same busbars. The expense had been thoroughly justified, said Col. Mallinson, who exhibited typical gale-outage records. Arrestors of the crystal valve type were installed in the northern section and they had had considerable success with plain sphere gaps at feeder terminals in the southern section.

Trouble was experienced when pole-mounted transformers were connected solidly to the lines. They were now fitted with expulsion fuses in insulating tubes, which could be removed from ground level for re-fusing. Some remote spur lines had repeating fuses with time lags of from 1 to 15 seconds.

Low-voltage distribution in townships was by five-core cables laid direct and by 2, 3, 4 and 5-conductor overhead lines in villages. The streets of practically all villages were now lighted by 60- and 100-W reflector lamps, controlled by time switches.

Dairy and Brewers' Exhibitions

THOUGH their products are somewhat different dairy farmers and brewers have much in common with regard to the electrical appliances they employ. At Olympia, London, last week the holding of the Dairy Show and the Brewers' Exhibition concurrently in adjoining halls it was possible to compare methods and also to appreciate the great strides that have been made in the electrification of both industries since the last exhibitions held in 1938.

Bottle washing, filling, capping and corking, refrigeration and air conditioning are now carried out almost entirely by electrical means in both industries and the equipment used is very similar. Some very high speeds of operation have now been obtained and machines are available for washing as many as 12,000 bottles an hour and for filling, corking and labelling at a rate of 600 dozen an hour. A glass washer can cope with 1,000 tumblers an hour. Though the methods used are rather different, pasteurizing too is common to both industries and it is interesting to see that electrode boilers are now being employed for the necessary steam raising.

Electrode boilers were also much in evidence in the Dairy Show for sterilizing purposes and a new device for the same purpose is a steam raising unit incorporating an electrically-heated metal block in the base section, a 50-gal. thermostatically-controlled storage water heater above providing hot water. Milking machines, cooling plant, churn stools and washers are now considered indispensable in the modern farm. In the ice-cream section recent legislation has laid emphasis on heat-treatment plant. Homogenizers, emulsifiers and automatic wrapping and packing equipment are also in much demand.

Many of the incubators used are now all-electric and models with capacities of 36,000 or more are available. The most modern types are of much-improved design and have the appearance rather of a refrigerator. Electricity is becoming increasingly utilized as well for brooders and egg graders.

No fewer than eleven exhibitors demonstrated the advantages of electric vehicles for milk delivery and besides the usual standard van there were several examples of the pram type.

Batteries for both vehicles and lighting purposes, cattle clippers, fencers and rotary scythes were also to be seen.

Electrical apparatus of especial interest to the brewing trade included barley screening plant, moisture-in-grain meters, temperature indicators, filter pumps, mixing machines, conveyors and elevators, box nailers, beer engines, floor scrubbers and polishers, carpet shampooing machines, and intercommunication telephones.

I.M.E.A. Notes

Next Year's Convention

As we have already reported, the British Electricity Authority has asked the Incorporated Municipal Electrical Association to proceed with the organization of a convention to be held next year. The Authority has agreed to act as guarantor, within specified limits, if the vesting date under the Electricity Act, 1947, should occur before the date of the convention. Subject to the concurrence of the Area Boards, the Authority will be prepared to give the necessary permission for the payment of the expenses of the two nominated representatives of each member of the I.M.E.A. on a scale similar to that which has previously been paid by the local authorities.

The Association states that details of the convention will be announced as soon as the vesting date is made known.

ASSOCIATION'S FUTURE.—As a preliminary to the extraordinary general meeting which is to be held to consider the future of the Association in view of imminent nationalization, a memorandum on the subject has been sent to the local centres of the I.M.E.A. It is suggested that the centres should convene meetings to discuss the matter so that members shall be fully conversant with the position before attending the extraordinary meeting.

CABLE PRICES.—Representations were made to the Council some time ago regarding increases in the prices of paper-insulated cables made by the C.M.A. in July. A sub-committee considered the matter and has decided that the increases were justified and the Council agrees.

Domestic Heating

Scope for Electricity and Gas

A PAPER on domestic heating in Great Britain was presented by DR. A. PARKER, director of fuel research, Department of Scientific and Industrial Research, at Nottingham recently, to the East-Midland Section of the Institute of Fuel.

The amounts of coal consumed directly and indirectly as coke, gas and electricity for that purpose are set out as percentages of the total utilized for all purposes. The evidence thus presented would appear to indicate that the overall efficiency of use of the 62 million tons consumed in 1938 was not more than 20 per cent.

Dr. Parker advocated greater employment of the closed and openable stoves, which are now being manufactured, instead of open grates.

Dr. Parker said that gas and electricity would continue to carry a large share of the cooking load throughout the year and a larger share than hitherto of the water heating load. He had no doubt that the main load in winter would continue to be carried by appliances burning solid fuel, with gas and electricity for short period intermittent heating.

He did not consider it economically practicable to extend gas works and electricity stations for carrying the whole of the domestic heating load of all houses throughout the year.

Ships' Electrical Equipment

I.E.E. Regulations Amended

ALTERATIONS and additions to the current Regulations for the Electrical Equipment of Ships have been authorized by the Council of the Institution of Electrical Engineers. A supplement to the third edition containing these amendments is being published, and the changes will have effect from November 1st.

The currency of the present edition is extended pending the issue of a completely revised fourth edition. The matters now dealt with are those which the responsible Committee regards as in need of urgent attention. The amendments embrace the whole field of the Regulations, but are chiefly concerned with the recognition of new types of cable and with developments arising from the use of a.c. in ships. The new cables now recognized under an amendment to Regulation 701 include polychloroprene-insulated cables of the " R.N.N." type, cambric-insulated cables with polychloroprene sheathing, and mineral-insulated copper-sheathed cables. The requirements covering the insulation of mineral-insulated copper-sheathed cables are set out in a new Regulation (917).

Among the changes introduced to deal with alternating current supplies is a new Regulation (105) requiring the adoption of standard phase-rotation for three-phase supplies, and another (416) which details the special requirements in relation to the installation of transformers. A new definition of tubular fluorescent lamps (B.S. 1270, type-reference MCF/U) is given, and the requirements in relation to the fittings and auxiliaries for such lamps are set out in a new Regulation (1007).

Tables 1 to 5, giving the current ratings of various types of cable, have been amended slightly in relation to cooling-air temperatures, and new tables have been inserted dealing with the current rating of three-core vulcanized-rubber-insulated cables and with cambric-insulated polychloroprene-sheathed cables.

Copies of the Supplement (1s.) may be obtained from the Secretary of the Institution, Victoria Embankment, W.C.2.

PERSONAL and SOCIAL

News of Men and Women of the Industry

A PRIZE of $2,000 has been awarded for a paper by **Messrs. A. N. Clark, J. Loughray** and **W. D. Garrick,** three members of the staff of Yarrow & Co., Ltd., entitled "Tubular Air-heaters of Welded Construction." The paper was entered in a world-wide competition run by the James F. Lincoln Arc Welding Foundation in America.

Mr. E. E. Hoadley, borough electrical engineer of Maidstone, was entitled to retire on pension in 1939, but carried on at the request of the Council. He now proposes to retire next October, and the Council is to obtain consent to pay him £2,000 at the expiration of his extended service.

Mr. Harold Hobson, former chairman of the Central Electricity Board, arrived home from Canada last week. He tells us that there is no foundation for the rumour published in an evening paper a week or two ago that he might become chairman of the Hydro-Electric Power Commission of Ontario.

The Senate of the University of London has conferred the degree of Ph.D. in the faculty of engineering (high-voltage engineering) as an internal student on **Mr. J. L. Miller,** of Stonehaven. Mr. Miller is taking up a post with the Electrical Research Association.

Mr. H. Deacon, general manager of Cryselco, Ltd., Bedford, has been elected to the board of the company.

Mr. O. S. Woods, of the West Midlands Joint Electricity Authority has been appointed resident engineer at the Manchester Corporation's Barton power station in succession to **Mr. W. E. Plowman** who is retiring.

Mr. W. H. Ainsworth, a member of the X-ray Department of Philips Electrical, Ltd., celebrated his silver jubilee with the company on October 10th and was presented with a gold watch by the managing director, Mr. S. S. Eriks. The presentation was followed by a luncheon at Frascati's, where his colleagues handed him a radio set and an illuminated address.

Mr. E. Dinsdale has been appointed by A. Reyrolle & Co., Ltd., as their district engineer for mining equipment in the Glasgow office. He succeeds **Mr. W. Rochester,** who has been appointed chief electrical engineer for the Central East Area of the Scottish Division of the National Coal Board.

After sixteen years at Rugby as mains engineer to the Corporation, **Mr. W. H. Shaw** has been appointed electrical distribution superintendent to Hitchin (Herts) Urban District Council. A native of Whitby, Mr. Shaw received his early training with Darlington Corporation Electricity and Transport Department.

Lt. Col. T. Walmsley left this country last month to take up the appointment of managing director of Dorman & Smith (Pty), Ltd., a new company about to be formed in South Africa. The new company will be a subsidiary of Dorman & Smith, Ltd. and DS Plugs, Ltd., of Manchester. Col. Walmsley, who received his early training with the Southport Corporation Electricity Department, was for twenty-eight years on the staff of British Insulated Callender's Cables, Ltd., with whom he served as a contracts engineer, and latterly as manager of their Contracts Estimating Department. His war experience with the Royal Corps of Signals included over five years in the Middle East, France, etc., in command of signal units.

Mr. A. S. Phillips, A.M.I.E.E., chief assistant with John Bruce & Partners, consulting engineers, is the chairman of the West Wales (Swansea) Sub-Centre of the Institution of Electrical Engineers for the 1947-48 session. Mr. Phillips received his education at Greenock High School and the Royal Technical College, Glasgow, and served an apprenticeship with Scott's Shipbuilding & Engineering Co. In 1921 he joined the Greenock Corporation Electricity Department as assistant mains engineer, and in the following year went to China to take up the position of operation superintendent with the Shanghai Power Co. He returned to this country in 1938 and took up his present position with John Bruce & Partners.

Mr. A. S. Phillips

Manchester Electricity Committee has appointed **Mr. O. S. Woods,** of the West Midland Joint Electricity Authority, to be resident engineer at the Barton power station in succession to **Mr. W. E. Plowman,** who has retired.

Mr. Gerald F. Thick, general manager of Macrome, Ltd., has just returned from a visit to America.

Dr. Matthew Luckiesh, director of the American General Electric Company's Electric Lighting Research Laboratory, has been awarded the Gold Medal of the Illuminating Engineering Society of America.

To study American cooker design, with a particular view to meeting the requirements of overseas buyers, **Mr. G. H. Rosam,** export manager of Parnall (Yate), Ltd., left on October

29th for a visit to Canada, the United States and Mexico. He hopes to be back by Christmas.

Two former " chiefs " of the Derby Corporation Electricity Supply Department (Messrs. G. H. Lake and F. Nicholls), Mr. F. H. Pooles, the present chief engineer and manager, the Mayor of Derby and Alderman A. Sturgess were among those present at a recent luncheon. Mr. T. P. Wilmshurst, doyen of the former " chiefs " was unable to attend but was sent a telegram of greeting. Speaking at the luncheon Mr. R. H. Gummer, a director of International Combustion, Ltd., said that Derby's faith in installing pulverized fuel plant twenty-one years ago had reaped a rich reward. He also mentioned that at that time the company had orders worth £500,000 in its books; to-day the figure was about £25 million.

The Fusegear Section of the English Electric Co., Ltd., held a carnival supper dance at Reece's Restaurant, Liverpool, on October 14th when over 500 members of the staff and works, and their friends attended. Old-time and competition dances were a feature of the function, the duties of M.C. being efficiently carried out by Mr. J. T. Wilson. A miniature whist drive was also held for which the M.C. was Mr. L. Patience. During the evening Mr. H. Simmonds (manager, Fusegear Section) welcomed the visitors, many of whom had travelled long distances, and added a special welcome to employees who had joined the Section since it was transferred to Liverpool. Those present included Mr. F. R. Smith (manager, Liverpool works), Mr. J. W. C. Milligan (manager, Stafford Works) and Mrs. Milligan, Mr. T. P. Jolly (chief works inspector) and Mrs. Jolly, Mr. A. Friswell (plant contracts manager) and Mrs. Friswell, Mr. G. F. Sills (manager, Manchester sales territory), Mr. J. E. McFarlane (chief of the Electrical Department, Liverpool Technical College) and Mrs. McFarlane, Mr. W. D. Graham (Liverpool sub-office) and Mrs. Graham.

The Dramatic Section of the Sports Club of the Micanite & Insulators Co., Ltd., recently gave a successful performance of Noel Coward's comedy " Hay Fever." The standard of acting was high and after entertaining appreciative audiences of the staff and their friends in the company's recreation hall for four nights the performance was repeated for two nights at Lloyd Park Pavilion at the invitation of Walthamstow Borough Council.

Obituary

Mr. W. Densham.—The death occurred on October 25th in his seventy-first year of Mr. William Densham, who was one of the small band of technical assistants which the late Marchese Marconi gathered round him in the early days of his experiments in England. After early experience in the G.P.O., Mr. Densham joined the Marconi Co. in 1899, and assisted Marconi in his early experiments in the Isle of Wight, at Poldhu, Clifden and in America. In later years Mr. Densham held technical and administrative positions in the head office of the company, and retired at the end of 1939. He returned to do war work in September, 1941, and left again at the end of 1944.

Mr. G. Jackson.—The death occurred on October 19th at the age of forty-two of Mr. Gilbert Jackson, lamp representative attached to the Liverpool branch of Philips Electrical Ltd. Mr. Jackson joined the Glasgow branch of the company (then Philips Lamps, Ltd.) in 1942, and was transferred to Liverpool last June.

Mr. C. J. Webb.—We learn with great regret of the death, on November 2nd, of Mr. Charles J. Webb, who had been a contributor to the *Electrical Review* for a great many years.

Mr. W. Gilkes.—Mr. William Gilkes, a charge engineer at the North Wilford power station, Nottingham, received a fatal electric shock on October 29th. He was thirty-nine years of age and had been with the undertaking for about twenty-two years.

Sir Leonard Pearce.—A memorial service to the late Sir Leonard Pearce, engineer-in-chief and director of the London Power Co. was held at the Westminster Chapel on Tuesday last. There was a large congregation representative of all branches of the electrical industry, including many of Sir Leonard's former colleagues.

Wills.—**Mr. Frank Hodges,** formerly general secretary of the Miners' Federation of Great Britain, and a member of the Central Electricity Board since 1927, left £132,960 gross, with net personalty £122,344.

Mr. W. E. Brunt, a former borough electrical engineer of Todmorden, who died on July 8th last, intestate, left £520.

Sir Harry Greer, a former chairman of Baird Television, who died on March 20th last, left £21,859 gross, with net personalty £18,725.

Mr. J. E. S. Gladwin, founder of J. E. S. Gladwin & Sons, electrical contractors, left £1,360 (net personalty £1,327).

Mr. A. Mackinnon, manager of Foster Electrical Supplies, Ltd., Leeds, left £3,131 (net personalty £3,079).

Mr. W. C. C. Hawtayne, M.I E.E., consulting engineer, left £11,165 gross, with net personalty £11,030.

Mr. E. Lyon, M.I.E.E., general manager of Ceag, Ltd., Barnsley, left £2,508 gross, with net personalty £1,994.

Mr. O. C. Jones, A.M.I.E.E., principal of Oswald Jones & Co., Maidstone, left £6,334 (net personalty £6,292).

Cable-Makers' Football Cup

In its first-round match in the C.M.A. Football Cup Tournament, Victoria Works Athletic Club (Johnson & Phillips, Ltd.), beat Edison Swan by 5 goals to 2. In the next round J. & P. will play Southern United Telephone Cables, Ltd. (Dagenham) on their home ground at Kidbrook.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Dry Battery Construction

IN view of the opinions sometimes expressed on the subject of the manufacture of flat-plate dry batteries, may I offer the following remarks:—

Contrary to general opinion, it is not necessary to force the carbon against the depolarizer as is customary in making can-type cells. In fact, the whole medium can be floating, provided the air film is absent. I am speaking from personal experience gained during the war.

It will be surprising if, ultimately, the whole technique of battery manufacture is not changed when this new approach is more fully appreciated. G. A. PERCIVAL.

Home and Export Plant

MAY I refer to the opening paragraph in your issue of October 31st where, although the meaning of your phrase "electricity supply" will be obvious to many, it may convey the wrong impression to others inasmuch as it is most commonly applied to the distribution of electricity, whereas it is generating equipment that is included in the "Prime Minister's List."

I feel it is particularly desirable to mention this at the present time, because after P.M.L. and export requirements have been met, it is uncertain how much of some essential materials will be available for the manufacture of distribution plant for Home electricity supply, in the immediate future.

Hackbridge, Surrey. WILLIAM C. KENNETT.

Quoting References

WILL you kindly air a plea from the commercial side of our electrical industry. As a correspondence clerk handling a mixed bag of letters from Government Departments, municipalities, manufacturers and consumers, I find that at least one quarter of these omit to state our references. This inefficient and slipshod method of dealing with a matter of elementary business routine causes many hours to be wasted by the recipient in tracing these references in a large organization.

Technical and commercial correspondents should impress upon secretarial and typing personnel the importance of correctly addressed letters noting that this means, among other things, a completion of the blank space "Your Reference...." whenever possible.

Manchester, 18. G. BROADBENT.

Results of Load Staggering

I HAVE not been satisfied that the conclusions drawn in your journal for the C.E.B. load curves are quite correct. These curves compare days after October 1st (the prescribed date for the load spreading to commence) with similar corresponding days before that date.

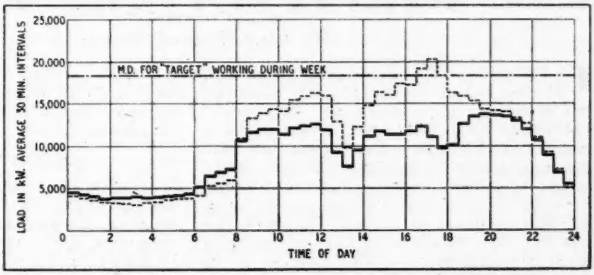


Fig. 1.—Comparative Load Curves in Islington

——— Wednesday, October 8th, 1947, with load spreading; 61 deg F at noon

------- Wednesday, October 9th, 1946, plus normal increase of 10 per cent; corrected from 56 to 61 deg F at noon

Apart from the time taken to put into operation any scheme (so that a gradual change comes about and not a sudden one), it seems to me that the only comparison that can be made is one against last year's results. These are shown for Islington in Fig. 1. Whether it will be maintained is yet to be discovered and depends on what the domestic consumer does. The fact remains, however, that after making adjustments for temperature and load growth on last year's curve, the

1947 curve shows that the industrialists and workers in Islington have complied very largely with the requirements.

What is perhaps more of interest is the variety of ways in which this has been accomplished as shown in the progress schedule. The agreed arrangements with 571 firms within seven sub-areas are summarized and the total shows that 28·4 per cent of the required 33⅓ per cent has been agreed and we expect to clear the remainder shortly. One of the largest contributory factors is self-generation at 6·7 per cent.

Islington, N.7. F. S. NAYLOR,
Engineer and General Manager,
Borough Electricity Dept.

Over-Current Relays

REFERRING to the letter in your issue of October 17th I am very pleased that Mr. Daines mentions the standardization of directional over-current relays. I think that standardization would be a good thing, but believe the final say in this matter would be with the manufacturers.

I am aware that a well-known firm in this country produces relays requiring opposite instantaneous polarity for contact opening with power flow towards the busbars while in the United States relays with like instantaneous polarity are used for the same purpose (see Monseth and Robinson: Relay Systems).

In my article (*Electrical Review*, October 3rd, 1947) I have chosen instantaneous polarity for power flow from line into bus, and it is obvious the vector relationship between current and voltages for instantaneous opposite polarity could be derived in similar manner.

Redruth. A. SALZMANN.

Export Ancillaries

WITH reference to the leaderette in your issue of October 24th, if we export all the hammers, how shall we nail up the export packing cases?

I notice that you envisage a further crop of forms, could we not export these?

"OUTIL."

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Col. Clarke moved to annul the Electricity (Stockholders' Representatives) Regulations, 1947 (S.R. & O. 1947, No. 2076). He said that the amending Order, which had just been presented to the House, had not many of the points to which objection had been taken. From the stockholders' point of view the Order was still inefficient and inept. The basic fact was once more shown clearly, as it had continued to be shown throughout the progress of the Electricity Bill, that great and unnecessary complications had been caused by the Minister's dissolving all the electricity companies before their affairs were wound up.

Major Peter Roberts, who seconded, hoped that the Order would be withdrawn and presented again in an amended form. It was, he said, unnecessary to ask companies to notify their shareholders of a meeting by registered letter. This might entail, for the larger companies, the spending of £1,000. Surely a quorum of 10 per cent where they had 50,000 shareholders was going a bit too far. Often it was impossible to get a hall to hold as many as 5,000 people.

Mr. Robens, the Parliamentary Secretary to the Ministry of Fuel and Power, said he could not withdraw the regulations. They had been drawn up in accordance with the Act. In the amending regulations they had dealt with a great many of the problems which had been raised. He would look into the points mentioned by Col. Clarke and Major Roberts and if there was any substance in them he would recommend the issue of another amending regulation.

Industrial Load Spreading

Mr. Hardy asked the Minister of Labour what progress had so far been made by the Regional Boards for Industry in securing agreement for arrangements to spread the industrial electricity load.

Mr. G. Isaacs said that the reports so far received were very encouraging. The Regional Boards and their district and other committees had received a very full measure of co-operation from both sides of industry and the results were a tribute to the value of full joint consultation in such matters. He was glad that it had not been necessary to impose or threaten sanctions in any industries.

Works Visit

Mr. A. V. Alexander, Minister of Defence, Sir Henry Tizard, and Sir Henry Wilson-Smith of the Ministry of Defence visited the Plessey Co., Ltd., Ilford, on October 31st, to inspect some of the results of the research and development carried out in the laboratories of the company during recent months. The party was shown over the laboratories by Mr. A. G. Clark, chairman, with other directors and executives.

Industry and the House

Nationalization and Management

By F. J. Erroll, M.A., A.M.I.E.E., M.P.

THE new Session of Parliament may be regarded as the watershed period of Labour administration. In the first two Sessions the Socialists' numerical majority swept Bills through the House on a flood-tide of ideological enthusiasm, and the Government implemented pre-election theories in a programme of experiments in nationalization. Now, at the start of Labour's third Session of power, there is every indication that the zeal for experimenting has been curbed, though not halted, by a severe lesson in simple economics—the national crisis.

Sir Stafford Cripps, in a frank and admirable speech on October 23rd during the debate on the Address, gave the House a lead as to the new dominant theme in Labour policy. The economic situation demands realistic day-to-day planning and not experiments in theories, and the new Session will be, in fact, comparatively uncontroversial so far as new Bills are concerned. The gas industry, however, is to share the fate of the electricity supply industry and will thus complete Mr. Shinwell's unhappy trilogy. This, Mr. Attlee said, is "really a logical development."

Efficiency the Yardstick

Although the gas industry is already largely under public ownership, it is impossible to accept the Prime Minister's terse explanation without reserve. Surely the Socialists can only justify the nationalization of an industry in terms of relative efficiency? It will be a bitter, vindictive farce if time proves that public ownership results in decreased efficiency. And already questions from Members on both sides of the House have clearly shown that the progress of management in those industries recently nationalized is to receive close and critical attention.

How well is the National Coal Board managing the coal industry now that ownership has been transferred? This question begged an answer when the N.C.B. was the subject of debate on the first day of the new Session. Sir John Mellor opened the discussion with a strong attack upon the Government's policy of shrouding the activities of the N.C.B. behind what he called an "iron curtain." This secrecy had lost the Board a lot of the goodwill it might have had, and Sir John thought it a matter of far-reaching principle for it might well apply to the affairs of other nationalized industries. This speech received support, surprisingly enough, from a Labour Member, Mr. Emrys Hughes, who stressed the need for the fullest light to be thrown on the Coal Board to prevent its becoming a top-heavy bureaucracy "carrying on the traditions of private capitalism."

Avoiding Excessive Interference

A reply by the new Minister of Fuel and Power, Mr. Gaitskell, embodied sound practical sense. Too much interference by the Minister with the activities of the nationalized industries would produce bureaucratic paralysis, he said. But his answers to criticisms about industrial relations between miners and managers were less satisfactory.

The debate on the motion by Colonel Clarke to annul the Electricity (Stockholders' Representatives) Regulations, 1947, revealed some pertinent examples of muddled legislation. Colonel Clarke's speech clearly illustrated the unnecessary complications that have been caused by the dissolution of the electricity companies before their affairs were satisfactorily wound up. For instance, Regulation I declares that stockholders' representatives must be appointed within two months of the date of the Regulation coming into force. During much of that period Parliament was not sitting, and two months was too short a period for many of the companies concerned to comply with the Order.

Other points substantiated the claim that the Regulations were badly drafted, and in his reply, Mr. Robens, the new Parliamentary Secretary, agreed to investigate the criticisms made by Colonel Clarke.

Sir Peter Macdonald asked the Secretary of State for the Colonies how long had elapsed since the East African Power & Lighting Co. made its application for permission to raise additional funds to cover existing and future commitments; and whether steps could be taken to accelerate a decision in the matter. In a written reply

Mr. Rees-Williams said that the company's application was made at the beginning of 1947, but that it was now in abeyance. Mr. Rees-Williams affirmed, however, that he was in communication with the Governments concerned in order to accelerate a decision in the matter.

It will be remembered that last November Mr. C. R. Westlake, the borough electrical engineer of Finchley, was requested by the Government to investigate electricity supplies in East Africa. His report, published earlier this year, was criticized by the East African Power & Lighting Co. as being too optimistic. Additionally, there is said to be considerable internal disagreement in the Colonial Office on various aspects of the Report, hence the delay in reaching a decision.

Cable Production at Newport

Standard Telephones & Cables' Works

ALTHOUGH it was still at the height of its war production, early in 1944 Standard Telephones & Cables, Ltd., began to formulate plans for post-war reconstruction, and decided to co-operate with the Government in its scheme for the distribution of industry and locate in South Wales and Monmouthshire area a part of the company's expanding manufacturing activities rather than further augment the London factories. Telecommunication cables and long distance transmission equipment was an entirely new activity for South Wales and Monmouthshire and Standard Telephones & Cables were selected to take over the Royal Ordnance Factory at Newport. The factory was transferred to the company in November, 1945, and work was commenced on the dispersal of gun-making plant. In the past two years a great deal has been done and on Friday last week Mr. G. A. Isaacs, Minister of Labour, and other visitors were the guests of the company to inspect the works.

Training Local Labour

At the beginning of 1946 it was possible to commence the transfer of plant and material from the company's war dispersal "locations" at Leicester. Training classes were begun to teach local labour the craft of assembling and wiring transmission line equipment and a nucleus of the staffs at Leicester and Woolwich were sent to Newport to build up the production lines.

Early in 1946 the wartime activities of the company's insulant plant at Enfield slowed down and ceased, to allow the transfer to Newport of rubber and plastic extrusion equipment, and operators from North Woolwich went to Newport to train local people in the many operations of cable making.

Miles of pipework had to be erected for service to rubber mixing machines. The three existing boilers had to be supplemented by a vertical 250 lb per sq in. boiler and a similar boiler was ordered for future loads. Two complete mains were installed to couple up with the steam boilers, and existing gantries had to be strengthened to support the new 7-in. diameter steam mains around the rubber and plastic cable shop. To provide cooling water to the rubber mills, Banbury mixers and calenders a suitable closed water system supplied from a 10,000 gall. storage tank by means of impeller pumps was designed, to provide pressure in place of gravity, and installed in trenches cut in the floors and covered with concrete slabs. To maintain the supply of water in this system five centrifugal pumps are used, capable of handling 40,000 gall. an hour at a pressure of 50 lb per sq in.

For the distribution of power over five miles of tubing and sixteen miles of wiring ranging from the smallest size to 0·2 in. cables have been used for serving the plant which includes 200-h.p. motors for turning the Banbury mixers.

An activity of particular interest at the new factory is the assembly of transmission testing apparatus required in ever-increasing quantities to test and maintain communication networks. There are now nearly 1,600 employees at the Newport works engaged on the production of textile, rubber and plastic covered cables and wires and transmission equipment.

Mr. Isaacs Meets Employees

Following an informal luncheon at which the visitors were welcomed by Sir Thomas Spencer (managing director), Mr. Isaacs addressed the employees in the canteen. Sir Thomas Spencer, in introducing him to the employees, said that the company had set a target of production for 1948, a large quantity of which was for export.

Mr. Isaacs referred to the Government's scheme of planned industry location and said it was the intention to take the work to the people by bringing it to the towns. The success of the scheme depended on the co-operation of employers and workers with the Government.

During the afternoon the visitors were escorted by guides around the works and saw the various processes of cable production, including the mixing of rubber and plastics, rubber and plastic extrusion, braiding of cables and wires, cord finishing, and the assembly of transmission testing apparatus.

Starting Turbo-Alternators

Outline of General Procedure

By M. P. Henzell

(Generation Superintendent, Scottish Central Electric Power Co.)

AVAILABILITY of modern large turbo-alternators may be seriously decreased by faulty operation during starting and stopping. Hard and fast rules cannot be laid down to cover all machines, but a programme of procedure from start to full load (Fig. 1) can be drawn up and adapted with but little modification to most types.

Most modern machines are fitted with quick-start ejectors capable of raising vacuum to the turbine starting value in about five minutes. Coupled with the use of automatic barring gear this ensures that turbine shaft distortion is unlikely to occur during the starting period. With older machines not fitted with quick-start ejectors or barring gear it may be necessary to raise vacuum to the maximum value possible before applying sealing steam to the shaft glands and thus ensure the minimum of local heating and shaft distortion. Whilst vacuum is being raised all steam pipe, steam chest, and turbine-casing drain valves should be checked and left wide open. The importance of this will be appreciated more readily when it is realized that condensation during running up results in 3 or 4 tons of water being formed in the larger machines.

At about 20 in. Hg vacuum, steam may be admitted and the turbine started and allowed to run at about 250 r.p.m. for 15 to 30 min according to the size of the machine. The speed may then be raised in easy stages of about 40 r.p.m. per min, passing through the critical speed as quickly as possible. The bearing oil temperatures must be carefully watched during this period and on approaching normal working temperature the water supply to the oil coolers should be turned on gradually. Keeping the water shut off the coolers ensures that the oil reaches working temperature more rapidly and reduces the risk of vibration due to shaft "climbing."

When up to speed the alternator may be synchronized and load applied at the rate of approximately 1·5 MW per min. The alternator temperatures should be carefully observed and, as normal operating temperatures are reached, cooling water may be

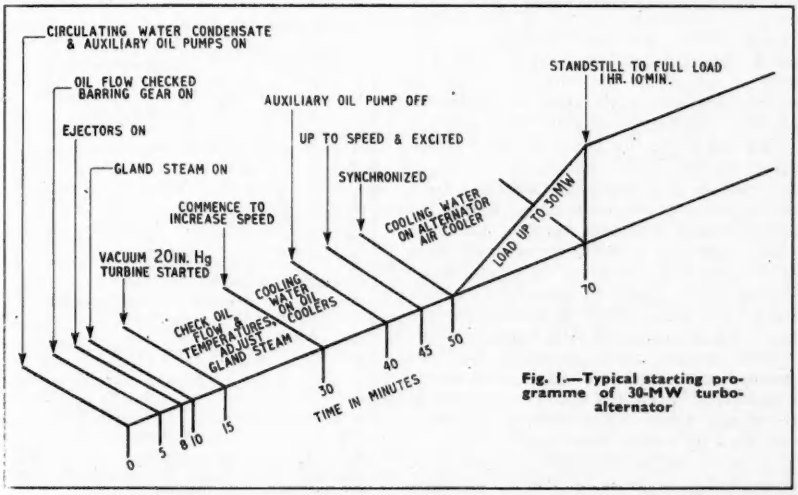


Fig. 1.—Typical starting programme of 30-MW turbo-alternator

applied to the alternator air coolers at a rate sufficient to keep the alternator temperatures steady. Where the machine is ventilated by a separately driven fan this should be started up late and shut down early in order to avoid subjecting the alternator and in particular the rotor windings to wide temperature limits.

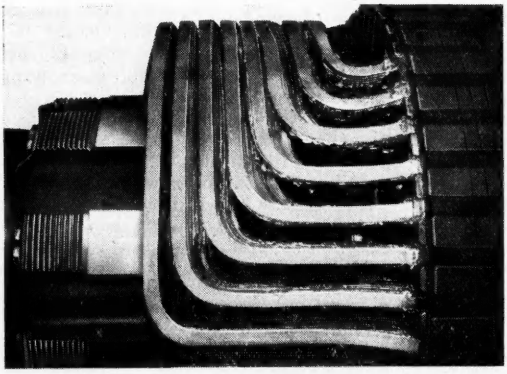


Fig. 2.—Rotor winding distorted through temperature variation

On shutting down, the reverse procedure is adopted with the generator. As load is dropped so the water is cut off the coolers. Where system conditions permit, the alternator may be loaded with kVA as the kW load is reduced, again with the object of maintaining the temperature as steady as possible. Failure to observe this procedure may result in the premature electrical breakdown of the rotor due to distortion of the windings or to severe vibration due to the displacement of the rotor conductors. The cause of such distortion has been stated by Juhlin[1] and Fig. 2 shows the serious nature of the distortion which can occur and which is the main cause of alternator outage throughout the country. In some cases, notably at Klip[2] in South Africa and Sheffield in this country, rotor preheating has been resorted to in order to allow the coils to expand free from the restraint exerted by centrifugal force. The method has been described by Coates and Pyle.[3]

As soon as the alternator has been disconnected from the bars, the steam supply to the turbine should be shut off by operating the hand-trip lever after partially closing the main stop valve. Turbines not fitted with barring gear may be run for a period with no kW load and maximum kVA load that conditions permit in order to cool the turbine rotors gradually and reduce the possibility of vibration.

All drains should then be opened and the auxiliary oil pump started up. The water supply to the oil coolers may now be gradually checked, in order to maintain the oil temperature near the working level. After the turbine has come to rest the barring gear will be started and kept running continuously in the case of a set shut down for the night hours only. In the case of turbines not fitted with barring gear, it is important that the auxiliary oil pump should be kept on for several hours to supply oil to cool the bearings. Failure to do this will result in excessive temperatures as indicated by the curve in Fig. 3, which shows the temperature as measured at the thermometer pocket of a large turbine high-pressure end bearing with and without the oil pump running after the main turbine has been shut down.

Finally the air ejectors should be kept operating for some time after the machine has stopped (the period depending on the capacity of the ejectors and the volume of the turbine and condenser steam space, but in general about 15 min), in order to dry out the

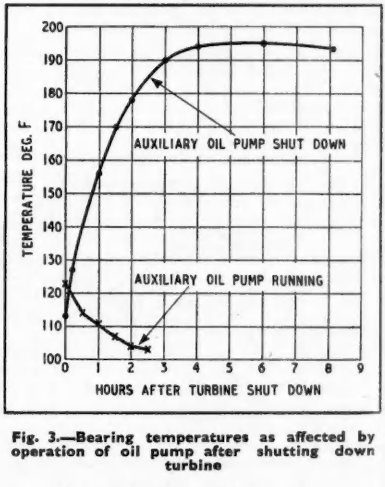


Fig. 3.—Bearing temperatures as affected by operation of oil pump after shutting down turbine

turbine and prevent rusting. It is important that a current of air should be permitted to pass through the turbine during the drying process and in some cases an air cock is provided on the steam chest for this purpose. Where such a cock is not provided it may be necessary to open the stop and throttle valves and draw air through the machine via the steam pipe drain.

References

[1] Deformation of Turbo-Alternator Rotor Windings due to Temperature Rise. (*I.E.E. Journal*, 1939, Vol. 85, Pt. 544).

[2] Klip Generating Station. Transactions of the S.A. Institute of Electrical Engineers. May 1940.

[3] The Operation of Large Turbo-Alternators to Reduce Rotor Winding Deformation (*I.E.E. Journal*, 1946, Vol. 93, Pt. II, p. 192).

Municipal Reports

Derby.—A table in the report of the chief engineer and general manager (Mr. F. H. Pooles) shows that the average price received per kWh sold last year (0·934d.) was lower than before the war (0·942d. in 1938-39). Ten years ago the price was 1·018d. The chief feature of the past year's working was an increase of nearly 18 million kWh (19 per cent) in supplies for lighting, heating and cooking. This was partly offset by a reduction in "power" consumption, but altogether sales rose by 9·6 per cent to 172 million kWh.

The Department generated 249·8 million kWh (against 246·7 million). Nearly 60 per cent of the fuel consumed was opencast coal from sites in the neighbourhood. Although supplies were inadequate and irregular, sufficient reserve stocks were available to maintain the required station output during the critical period. At that time a useful contribution was made by Rolls-Royce, Ltd., who at short notice adapted their engine endurance testing plant for the generation of electricity.

Total revenue amounted to £721,936, an increase of £60,770. Working expenditure, at £599,371, was up by £66,655, but loan charges, etc., were £20,045 down and other net revenue expenditure (income tax, etc.) decreased by £13,038, leaving a net profit of £32,270 compared with £5,072 in 1945-46.

Douglas (I.O.M.).—The report of the borough electrical engineer and manager (Mr. B. Kelly) shows that since 1939 the quantity of electricity sold by the Corporation has doubled, amounting to 21·9 million kWh last year compared with 10·7 million in the year immediately before the war. Of last year's total, 11·2 million kWh was supplied to the I.O.M. Electricity Board. In comparison with 1945-46 the sales in the Corporation's own area increased by 1·1 million kWh (11·6 per cent). Per consumer the quantity sold (private supply) rose from 1,393 to 1,515 kWh and per head of the population, from 373 to 416 kWh. During the year the 10 per cent surcharge on accounts was reduced to 7½ and later to 5 per cent. Income totalled £180,035 (£170,788) and there was a net profit of £4,380 (£9,109).

Portsmouth.—Reference is made by the engineer and manager (Mr. R. H. Coates) to the experimental installation of oil burners at the power station for burning oil over the normal chain grate of the furnaces. From a technical point of view, he says, the installation has been successful, but the delay in obtaining measuring equipment has prevented any efficiency tests being carried out. Oil firing is more expensive than coal, but Mr. Coates considers it probable that such oil installations, if confined to a small proportion of the boiler capacity, will be economically justified as "peaking capacity." They are expected to reduce materially the fouling of boiler surfaces which is particularly prevalent at high loads.

Besides extensions at the power station which were nearing completion at the end of March, extensive distribution schemes have been prepared, including a comprehensive rural development project to make electricity available to nearly every house in the area.

Last year the undertaking generated 274·5 million kWh against 236·3 million in 1945-46. Excluding bulk supply, sales amounted to 175·3 million kWh, an increase of 18·2 million kWh (11·6 per cent). Income aggregated £1,146,807 (£1,077,815), with working expenses at £1,015,834 (£974,089) and there was a net surplus of £5,802 against a loss in the previous year of £9,245.

Watford.—A noteworthy feature of the past year's working of the undertaking is that under the domestic ("Norwich") tariff the average consumption per user reached 6,034 kWh and the net average price obtained fell to 0·5d. Altogether consumers in this class used 36·3 million kWh, more than twice as much as in the immediate pre-war year. Total sales amounted to 125·1 million kWh, an increase of 11·1 per cent on 1945-46, the average price received being 0·91d. This is the last annual report of Mr. A. W. Barham, chief engineer and general manager, before his retirement. Since his appointment the consumption per head of population has risen from 36 to 924 kWh.

The accounts show a gross revenue of £495,833, an increase of £45,077, while working expenses rose by £54,261 to £441,058. After meeting loan charges, etc., there was a net deficit of £5,008 against a profit of £4,541 in the preceding year. In spite of the restricted supply, total sales of apparatus amounted in value to about £23,000.

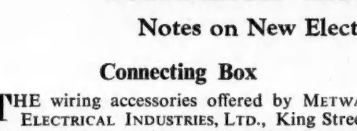
Increased use was made of the power station which generated 52·4 million kWh against 26·7 million in 1945-46, the maximum load being 35,850 kW (33,150 kW).

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Connecting Box

THE wiring accessories offered by METWAY ELECTRICAL INDUSTRIES, LTD., King Street, Brighton, 1, include the pressed steel "Connecta box" which is designed to accommodate ⅜ and ½ in. close-joint conduit, but the plain



Pressed steel "Connecta box" containing "Scruit" connectors

entry can be made to maintain continuity even when screwed conduit is employed. It is 1 ⅜ in. wide by 4 in. long and its elongated shape should be advantageous by comparison with the ordinary round box where installation space is restricted.

Improved Torch

A hand torch for industrial and general uses is announced, under the trade name of "Varley," by OLIVER PELL CONTROL, LTD., Cambridge Row, Woolwich, London, S.E.18. The case is a seamless aluminium alloy tube with a girdle of "flats" to prevent its rolling when laid on a flat surface. Ordinary dry cell batteries and a 2·5-V lamp bulb of standard 12-mm diameter are used. It has an improved switch, and instead of the usual spring in the base of the torch contact pressure is maintained by two opposed plungers containing a coiled spring. These move vertically between the battery top and the base of the lamp, so permitting the latter to be focused in the parabolic reflector. The torch is jig built for interchangeability of spare parts, which can be bought separately.

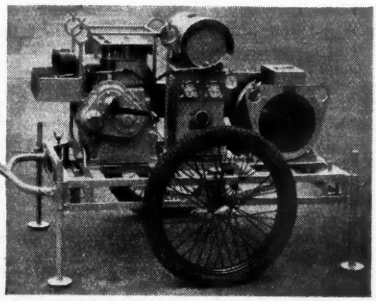
Ice Cream Cooler

A dual-purpose cooler of the immersion type, which seems to be equally suitable for dairy farmers and ice cream makers, is offered by KLINE-CURTIS DEVELOPMENTS, LTD., 8, St. Paul's Square, Bedford. The cooling element is a coiled tube, made of stainless steel or "Inconel," so dimensioned as to enable it to be inserted quite easily into an ordinary metal milk churn. Rubber hoses connect the coil to a motor-driven pump for circulating brine from an insulated tank containing a copper tube evaporator served by an ordinary condensing refrigerator.

Thus the contents of a 12 gal. churn can be reduced from milking temperature to 40 deg F in 20 minutes. A similar quantity of pasteurized ice cream mix can be poured hot into a churn and, by simply circulating tap water through the coil, cooled from 190 to 65 deg F in about an hour before transference to the freezer. Alternatively, by withdrawing the water coil and inserting a brine coil at 17 deg F, second stage cooling from 95 down to 40 deg F can be effected in 30 minutes. The total cooling time is therefore within the 90 minutes allowed by the regulations governing the bacterial processing of ice cream mix.

Light-weight Welder

An engine-driven welding set which can be dismantled, so that the component parts can be carried to places inaccessible to any form of vehicle, has been constructed for an oil company by MUREX WELDING PROCESSES, LTD., Waltham Cross, Herts. A set of this weight and output cannot be made to comply with BS. 638, but the purchasers agreed to accept a machine that may become hotter in use than is allowed by the specification, provided Class B



Light-weight dismountable welding set

insulation was used to minimize the burn-out risk.

The twin-cylinder Petters petrol engine is air cooled without a radiator, developing 10 h.p. at 2,000 r.p.m. and weighing 280 lb; it drives the generator by five 0·5 in. vee belts at 3,000 r.p.m., furnishing 150 A at 25 V and weighing 218 lb. The bedplate is of lattice construction with a control panel in the middle on which are mounted miniature ammeter, voltmeter, shunt regulator and terminals for the welding leads, weighing 280 lb. The two motor-bicycle wheels can be very easily and quickly detached from the bedplate.

COMMERCE and INDUSTRY

Hours and Wages. Nottingham Bus Lighting.

THE October *Ministry of Labour Gazette* publishes tables showing the results of an inquiry into hours and wages in industry during the last pay-week of April last. From these we have extracted figures relating to the various sections of the electrical industry. It will be observed that in the electrical engineering and electricity supply branches (in which the employees are preponderantly male) the average hourly earnings are very similar. The average works out lower in the case of electrical apparatus, cable and lamp manufacture in which nearly half of the employees are women and girls. The even lower rate in the electrical contracting industry is apparently accounted for by the high proportion of youths employed.

HOURS AND WAGES LAST PAY-WEEK OF APRIL, 1947

Section	Men (21 and over)	Youths and Boys	Women (18 and over)	Girls	All Workers
Electrical Engineering—					
Numbers covered	78,511	12,234	34,033	2,674	127,452
Average earnings	129s. 1d.	41s. 6d.	73s. 5d.	39s. 5d.	104s. 0d.
„ hours worked	45·5	42·8	41·7	41·5	44·2
„ hourly earnings	34·0d.	11·6d.	21·1d.	11·4d.	28·2d.
Electrical Apparatus, Cable, Lamps, etc.—					
Numbers covered	64,376	6,052	53,254	5,227	128,909
Average earnings	128s. 2d.	45s. 4d.	71s. 8d.	40s. 5d.	97s. 6d.
„ hours worked	46·4	42·8	41·1	41·9	44·0
„ hourly earnings	33·1d.	12·7d.	20·9d.	11·6d.	26·6d.
Electrical Wiring & Contracting—					
Numbers covered	4,840	2,476	77	19	7,412
Average earnings	128s. 4d.	35s. 11d.	*	*	96s. 7d.
„ hours worked	49·2	46·7	*	*	48·2
„ hourly earnings	31·3d.	9·2d.	*	*	24·0d.
Electricity Supply—					
Numbers covered	79,293	4,572	1,577	45	85,487
Average earnings	121s. 5d.	41s. 8d.	72s. 2d.	*	116s. 2d.
„ hours worked	49·4	46·0	40·8	*	49·1
„ hourly earnings	29·5d.	10·9d.	21·2d.	*	28·4d.

* Figures not available.

Further tables show the average percentage increases in weekly and hourly earnings between October, 1938, and April, 1947. In the electrical branches the hourly rate (all workers) is shown to have increased by the following percentages:—Electrical engineering, 120; electrical apparatus, cables, lamps, etc., 111; wiring and contracting, 72; and electricity supply, 69.

Contracting Industry Agreements

The National Joint Industrial Council for the Electrical Contracting Industry has agreed that the London Area shall be extended as from the second pay-day in December from 12 to 15 miles radius from Charing Cross, including certain towns on the radius line. Thus the Grade "A" rate of 2s. 9d. per hour (which includes an amount in respect of travelling time) and the London Working Rules will operate within a larger area.

Increased payments in respect of travelling time and fares are to be put into force in the Manchester District as from the first pay-day in November.

Stockholders' Representatives

The Electricity (Stockholders' Representatives) Regulations made by the Minister of Fuel and Power under Section 21 of the Electricity Act, 1947, call for the appointment of a "stockholders' representative" to represent the interests of all holders of securities of certain authorized electricity undertakers, power station companies and electricity holding companies. A number of supply companies have within the past week given notice convening meetings for this purpose.

E.D.A.—E.R.A. Co-operation

The general manager of the British Electrical Development Association (Mr. V. W. Dale) recently drew the attention of the Association's General Purposes Committee to the advisability of setting up simple machinery to prevent overlapping in certain sections of the work of E.D.A. and the British Electrical and Allied Industries Research Association. The matter recently arose in connection with an E.R.A. memorandum to members of Section K—Electricity Supply Technology—in which the intention was announced of applying the scientific methods to the study of load characteristics of domestic appliances and domestic consumers.

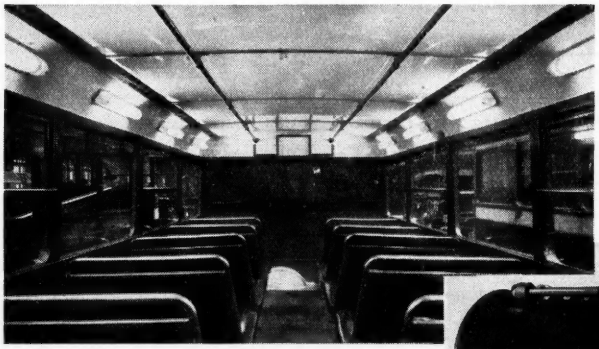
The General Purposes Committee recommended (and the Council has approved) the formation of a Joint Consultative Committee on which E.D.A. would be represented by Messrs. F. Newey and W. N. C. Clinch, chairman and

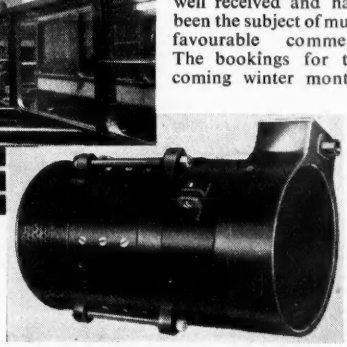
vice-chairman of the Domestic Installations and Appliances Committee, and Mr. Dale. It was also agreed, that, with the concurrence of E.R.A., Mr. J. R. Jones should be an additional representative on E.R.A. Section K.

Fluorescent Bus Lighting

The first complete installation of fluorescent lighting in a double-decker diesel engined bus in this country has just been put into service by the Nottingham City Transport in connection with its Golden Jubilee.

The power supply unit and switchgear have been supplied by C.A.V., Ltd. The former comprises a high-speed rotary convertor having





Nottingham diesel bus equipped with G.E.C. fluorescent lighting. Right: The C.A.V. high-speed rotary convertor

an output of approximately 400 W at 400 c/s, 3-phase, 100V, the d.c. supply being from the 24-V battery. The convertor, which is only 9-in. long and weighs 13 lb, is a single armature, double wound unit with a common six pole field system and runs at 8,000 r.p.m. The unit is suspended in rubber in a sound-proofed container (15-in. long overall and 11-in. in diameter) which is mounted under the off side rear seats near the wheel arch. The complete power unit with silencing arrangements weighs 30 lb. Plug and socket type connectors are used, the plugs being mounted on the end plates of the container.

The C.A.V. switchboard contains a solenoid operated switch for connecting the motor to the battery and a thermal delay switch which is arranged to allow the machine to run up to its normal frequency before connecting the a.c. output to the lamp circuits. This scheme enables all switching to be carried out on the low-voltage side by means of a small control switch, the length of main supply leads to the rotary convertor thus being kept to a minimum.

Twenty-three specially designed G.E.C. fluorescent fittings are employed, each totally enclosed by a reeded " Perspex " diffusing cover with opal ends, and carrying a 15-W Osram " warm white " fluorescent lamp. The auxiliary gear has been made as small as possible and is fixed behind each fitting. The circuit allows of virtually instant starting, and practically constant light output, in spite of the variations which inevitably occur in the supply frequency and voltage. The average illumination is over 12 lumens per sq ft.

Northmet Film Unit

About twelve months ago the Northmet film unit was formed for the production and display of films having, *inter alia*, educational, instructional and historical value. The display section, using a mobile projector equipment, has already given approximately 150 shows to local organizations, such as Women's Institutes, Youth Movements, Young Farmers' Clubs, schools, etc. These shows were well received and have been the subject of much favourable comment. The bookings for the coming winter months are heavy, including requests for further shows from those participating last winter. The production side has been handicapped by lack of equipment and other difficulties, but the second film " Northmet Cine Magazine No. 2 " has just been released. This is in colour, with John Snagge as commentator; it runs for about twenty minutes, and deals in an interesting way with new aspects of Northmet service.

Rubber Production and Consumption

According to the *Rubber Statistical Bulletin* for September-October (W. H. Smith & Son, 2s.), the estimated production of natural rubber in the principal territories during the first eight months of this year was 797,500 tons, as compared with 425,000 tons in the corresponding period of 1946. Consumption in this period is put at 720,000 tons (against 275,000 tons). Synthetic rubber production in the eight months is estimated at 405,000 tons (against 535,124 tons in January-August last year and consumption at 437,500 tons (against 637,500 tons).

The total stocks in the United Kingdom at the end of July were:—Natural 145,139 tons; synthetic 2,450 tons; total 147,589 tons. On January 1st the total stocks were 184,445 tons (natural 181,024 tons). The consumption of rubber by the British cable-making industry during the first seven months of this year is stated to have been 4,974 tons (4,590 tons of natural and 384 tons of synthetic).

Electrical Problems in Rubber Industry

The very heavy power requirements of a rubber factory, due to the compounding processes, were discussed in a paper, " Mechanical and Electrical Problems in the Rubber Industry," read to the Engineering Society of the English Electric Co., Stafford, on Wednesday, by Mr. E. F. Powell, head of Dunlop's Physical Research Division. For its size, he said, the rubber industry was one of the heaviest power consumers. He also dealt with the danger of fire arising from the presence of static electricity, explaining how, because of the physical properties of rubber compounds, voltages as high as 250 kV were generated. Mr. Powell gave demonstrations of the special Dunlop meter for measuring these charges without approaching too close to the compound.

Cyprus Power Station Fire

The Nicosia (Cyprus) power house plant which was seriously damaged in a disastrous fire last month has been shipped to Palestine for repair. With the assistance of the R.A.F. and Army units on the island essential public utilities are being supplied with electricity, but there is no likelihood of homes getting power and the town returning to normal for a long time, it is officially stated. The fire started with a turbine explosion at the power station and the electricity supply was cut off, the whole town being plunged into darkness. One person was killed and a number injured in the explosion. R.A.F., military and civil units fought the fire.

Henley Education Scheme

The fifth conversazione in connection with the Henley Education Scheme was held on November 1st at the Woolwich Polytechnic. Mr. A. H. M. Jacob, director of W. T. Henley's Telegraph Works Co., who presided, said it was their policy to encourage junior employees to take full advantage of the scheme, which had now been in operation for about five years. He thanked the committee under the chairmanship of Dr. Dunsheath and the deputy chairman, Mr. S. E. Goodall, for their work. Sir Montague Hughman, chairman of Henley's, presented the prizes and awards to successful students.

The principal speaker was Dr. P. Dunsheath, a director of the company, who described some of his experiences on a recent visit to Australia and New Zealand. Dr. Dunsheath urged all young men to fit themselves for responsible positions. Time and again, when some post had to be filled, the utmost difficulty was experienced in finding the man for the job.

After Mr. A. A. Frazier, one of the students, had expressed the thanks of himself and his fellow students for the facilities granted by the company, Henley's education officer, Mr. V. B. Twiss, concluded this part of the proceedings with a brief report of the year's work. He said that this year's examination successes had broken the record established last year.

An exhibition of students' handicrafts, engineering models and scientific apparatus, arranged by Mr. J. H. Savage and Mr. H. C. Hoban, was very well attended.

New Dublin Factory

A factory for the manufacture of electrical equipment is being established in Eire by the Aberdare Electric Co. The directors of the new company, formation of which has been approved by the Ministry of Industry and Commerce, are Sir George Usher, Sir Robert Renwick, Mr. William Dwyer, Mr. C. O. Stanley, Lt. Col. H. Boyd-Rochfort, Mr. F. G. Penny and Mr. J. Digby. The authorized capital is £400,000, of which £210,000 in ordinary shares of 5s. each will be issued in the first instance. Of these shares Aberdare Cables, Ltd., will take one-third, the Irish directors one third, and the remaining third will be reserved for the Irish public.

The scheme will be put into execution as rapidly as possible. A factory site of more than 30 acres is being acquired at Finglas, Co. Dublin. Wire drawing will be one of the chief activities.

Recent British Standards

Recommended forms for boiler-house daily log-sheets and weekly summary sheet with notes on their use are published by the British Standards Institution 28, Victoria Street, S.W.1, in B.S. 1374, which also lists the instruments and measuring equipmen required.

Copper Tubes (Heavy Gauge) for General Purposes, B.S. 61: 1947, is a revision of that part of B.S. 61: 1913 which related to tubes, the threading details being published separately in B.S. 61, Part 2. Thickness of tubes has been co-ordinated with other specifications, and some slight alterations have been made to outside diameters. Clauses covering inspection and testing have been added.

American G.E. Scraps Profit-Sharing

The American General Electric Company has abolished its profit-sharing plan, under which it has distributed $3,000,000 to 160,000 employees this year, but is making no change in an " extra compensation " scheme for the company's executives. The Production Employees' Union is protesting against the decision, claiming that the company's net income was $56,459,434 in the first nine months of this

year—the largest in its history. The company's president, Mr. Charles E. Wilson, states that there is no inconsistency in abolishing one plan and keeping the other, since the profit-sharing programme no longer serves its purpose of increasing the employees' interest in the welfare of the business, while the extra compensation plan does serve as an incentive to the executives to enhance the company's prosperity and create more earnings for the employees.

Town-to-Town Distances

A chart showing at a glance the distances between 77 of the leading cities and towns in Great Britain and, by means of a subsidiary table, distances between about 300 other towns has been produced by the Royal Automobile Club for the *Autocar*. This should prove useful to others than motorists who are concerned with transport. The chart is published by Iliffe & Sons, Ltd., Dorset House, Stamford Street, S.E.1, at 1s. (postage 1d.).

N.E.S.C.O.E. Association

In the report in our last issue of the annual dinner of the North-Eastern Electric Supply Company's Old Employees, reference was made to amendments relating to staff members which were introduced in the 1947 Bill during its passage through Parliament. Regrettably the name of Sir Arnold Gridley, who as M.P. initiated these amendments, was omitted.

Scottish Factory Opened

Begun in April last by Scottish Industrial Estates, Ltd., for the Telegraph Condenser Co., Ltd., North Acton, the new factory at Whiteside, Bathgate, was officially opened on October 30th. Mr. W. H. M'Fadzean, chairman of the company, said he felt sure that the completion of the part of the factory now occupied constituted a post-war building record in Britain. Although building was begun only in April half the factory was in production by the end of August. More than 400 workers are employed at present, and the number is expected to rise eventually to about 1,000.

Tin Plate Workers' Scholarships

The Court of the Worshipful Company of Tin Plate Workers alias Wire Workers is offering nine travelling scholarships for 1948. The conditions are the same as for the 1947 scholarships and include a proviso that candidates must be presented by a trade association or a trade union connected with the name of the Company.

Batti-Wallahs' Society

Atomic research was the subject of a talk by Dr. T. E. Allibone at last week's luncheon of the Batti-Wallahs' Society. Dr. Allibone traced the research work which led to the production of the atomic bomb and the manufacture of plutonium. Referring to the use which could be made of nuclear energy for peaceful purposes, Dr. Allibone said that a graphite pile producing one million kW or more at high temperatures should be ready in the early 'fifties and it was not unreasonable to expect that others would be ready by 1957. The increasing number of graphite piles would mean production of greater quantities of plutonium, and perhaps the greatest problem which had to be faced was how to regulate human behaviour so as not to abuse the use of plutonium. The graphite piles produced radioactive substances with possible uses in medicine which would confer great benefits on mankind.

Research in Industry

A survey of scientific and technical research covering 75 per cent of the total of such work in this country has been published by the Federation of British Industries at 1s. net. Dr. P. Dunsheath and Sir Clifford Paterson were members of the supervising sub-committees. Replies to a questionnaire by 420 industrial concerns, including 31 electrical, are analysed in sixteen tables and two appendices and general conclusions are summarized.

Trade Publications

British Thomson-Houston Co., Ltd., Bridle Path, Watford, Herts.—Brochure (L.740/M) entitled "Industrial Efficiency through Good Lighting," explaining how and why proper illumination increases the effectiveness of productive workers.

Philips Electrical, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.—Priced catalogue of lamps of all types and sizes.

Arora Co., Rosebery Street, Loughborough.—Leaflet (C.471) on hot-cupboards and grill-toasters for restaurants.

Collier Electric (Switches), Ltd., Central Avenue, West Molesey, Surrey.—Leaflet (M.2) on a 2A push-button switch-in-line.

Steatite & Porcelain Products, Ltd., Stourport-on-Severn, Worcs. — Multi-lingual leaflet (No. 32) on steatite insulating beads.

Morphy-Richards, Ltd., 121, Victoria Street, London, S.W.1.—Priced leaflet on "Cyldon" door-signal chimes.

Lumsden Lamp Co., 252, Millburn, Almondbank, Perth.—Brochure (No. 145) on ultra-violet treatment lamps.

Cressall Manufacturing Co., Ltd., Tower Street, Birmingham, 19.—Leaflet (No. 87) on toroidally wound potentiometers. Priced leaflet (List 88) on rotary rheostats and potentiometers.

Trade Announcement

Mr. H. Finch, Ormskirk, Lancs., has been appointed representative for T.M.C.-Harwell (Sales), Ltd., for the sale of "Temco" clocks in Yorkshire, Lancashire, Cheshire and North Wales.

Lighting in Ships

Use of Fluorescent Tubes

EARLIER this year the T.S.S. *Orion*, of the Orient line was released from Government duties as a troop carrier. Before her first post-war voyage on the England-Australia run she was reconverted by her builders, Vickers-Armstrong, Ltd., and the latest developments in decorative features and lighting effects were introduced throughout the ship, including " Metrovick " fluorescent tubular lighting in the public rooms.

The owners' consultant architect, Mr. B. O'Rorke, has created fluorescent lighting units of distinctive design, and the Metropolitan-Vickers Electrical Co., Ltd., was responsible for the mechanical and electrical details of manufacture. Special attention has been paid to ensuring that the electrical accessories housed in the fittings are readily accessible for maintenance, etc., but are not obtrusive in any way.

In the first class lounge on " B " deck, " warm-white " tubes are housed with accessories in the architectural coves in the aisles and central area. The central lighting feature in the new restaurant on " A " deck comprises six " warm-white " and six " daylight " fluorescent lamps mounted alternately behind etched glass laylights with switching arranged to provide three different colour effects. Flanking the laylights are two large pendant louvred units each housing six " warm-white " fluorescent lamps mounted in two rows of three. At each side of the restaurant, near the windows, four louvred units are recessed into the ceiling beam, each unit housing one " warm-white " and one " daylight " fluorescent lamp. Similar louvred fittings are used in the new foyer lounge on " A " deck. Lighting of the main central area of the first class dining saloon is by means of " warm-white " lamps housed in the cornices of the dome. The intensity of illumination of this area is approximately 8 lumens per sq ft.

In the dance space on " B " deck " warm-white " lamps are mounted in the cornices to provide general illumination. Above these fluorescent units a multi-coloured lighting effect is provided by groups of different coloured lamps, the colour combinations being controlled and continuously varied by an automatic motor-operated dimmer, operated from the dance control console, which was specially designed by the shipbuilders' Electrical Department.

" Metrovick " warm-white and daylight fluorescent lamps mounted behind laylights on the T.S.S. *Orion*

Equipment for New Cunarder

The British Thomson-Houston Co., Ltd., has been given the contract to supply " Mazdalux " fluorescent lighting fittings for equipping all public rooms and spaces of the R.M.S. *Caronia*, the 30,000-ton Cunard-White Star vessel, which was recently launched by H.R.H. Princess Elizabeth at John Brown's Clydebank shipyard. Working in collaboration with the decorative architect, Mr. J. P. McBride, of McInnes, Gardner & Partners, Ltd., Glasgow, B.T.H. lighting engineers have introduced many new features in the design of fittings, some of which are in the process of manufacture, in readiness for erection aboard the ship at an early date. The " Mazda " 40-W, 4-ft " warm-white " fluorescent lamp will be employed in most of the basic lighting units, with specially tinted diffusing glass filters. These, together with a careful selection of pastel tints for the ceilings, will ensure excellent colour rendering.

The *Caronia* will be the fourth big modern Cunarder to be equipped with electric motors made by Laurence, Scott & Electromotors, Ltd., for the drive of auxiliaries. She will have about 200 L.S.E. machines totalling 4,000 h.p., on cargo winches, engine room pumps and fans, steering gear, etc. The four main circulating pump motors are each of 50/100 h.p. and the draught fans total nearly 700 h.p.

NEW BOOKS

Power Plant Handbook. Illuminating Engineering.

Electric Power Equipment. By J. G. Tarboux, Ph.D. Pp. 493; figs. 373; index. McGraw-Hill Publishing Co., Ltd., Aldwych House, Aldwych, London, W.C.2. Price 30s.

The contents of the book would have been more readily understood in this country had the title been "Generation, Transmission and Distribution of Electrical Energy." It is well illustrated by photographs and line drawings and has very few misprints, although "power" and "energy" appear to be used as synonymous terms.

As a textbook it appears to be too sketchy for junior students, but may be useful as a reference book to seniors who already know their theory. Numerous references to other works are provided. Section 79, page 174, contains statements too involved to be understood without reference to such a book as "Transformers" by Dr. Gisbert Kapp, but to which no reference is made. Again, transformer oil is too complicated to be dealt with in paragraph 87 and a reference to a standard work would have been appropriate.

Against this, Chapter XIV gives detailed information on short-circuits and is quite good, but the formulae quoted in Chapter XV are not of great use unless their derivation is properly understood; the author may be more interested in Chapters XIII, XIV, and XV than in the others. From Chapter XV onwards the book is sketchy although the elementary diagrams given in Chapter XVII are helpful where the text is scanty. Chapter XXI contains a comprehensive and useful account of the Tennessee Valley project. The book is well worth reading and I have both enjoyed it and learned from it, since American practice is not always current over here. I feel, however, that we should regard it more as a handbook than a textbook and must remark that not more than 50 per cent of the questions for class discussion at the end of each chapter have been dealt with in the chapter.—F.J.T.

Textbook of Illuminating Engineering. By J. W. T. Walsh, M.A., D.Sc., M.I.E.E. Pp. 185; figs. 135; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 17s. 6d.

This book, which has been prepared to assist students for the intermediate grade examination in illuminating engineering of the City and Guilds of London Institute, was written at the request of the Illuminating Engineering Society. It makes its appearance at an opportune moment in view of the courses in this subject about to commence at a number of technical colleges and will be welcomed by both students and instructors. Students undertaking such courses will now have the syllabus covered in a single textbook and will no longer need to collect information from many scattered sources. This book works steadily through the syllabus and gives the student no more and no less than he needs to know. Although the amount of mathematics is kept within reasonable limits a word of caution in the preface reminds students that they are expected to have reached the necessary standard in mathematics before undertaking the study of illuminating engineering.

The book comprises twelve chapters, of which the first five deal with fundamental principles and photometry. Subsequent chapters cover daylight, light produced by combustion (gas, petrol-air gas, acetylene, etc.), light distribution and design and the supply of energy for lighting. There are an introductory list of symbols and abbreviations, some useful tabular matter in appendices and, naturally an important item, specimen examination papers and answers. This book is well illustrated and there is an adequate index.

Dr. Walsh, a past president of the Illuminating Engineering Society, is internationally known through his association with the National Physical Laboratory and his many contributions on illumination and photometry. Naturally, therefore, he brings to his task very full technical knowledge, but he also reveals, what in this case is particularly needful, a gift for lucid and concise exposition.—J.S.D.

Illuminants and Illumination for Microscopical Work. By F. E. J. Ockenden, M.I.E.E., F.Inst.P. Pp. 26; figs. 9, Williams & Northgate, Ltd., 36, Great Russell Street, London, W.C.1. Price 2s. 6d.

This monograph is a companion to another on the electron microscope, which appeared just a year ago, by the same author, who is an authority on electrical instruments as well as a practical microscopist; both have been published for the Quekett Microscopical Club. The variety of methods of artificially illuminating the specimen being examined is indicative of the constant search for something better; not only intensity, which involves means of preventing overheating, but also the wavelength of the light is of consequence, so the author's detailed discussion of light sources will be helpful.

After briefly considering terms and definitions with a few comments on the spectral sensitivity of the human eye, he explains why the only practical sources are electric lamps, several types of which are described, finally considering with the aid of optical diagrams some of the many arrangements possible for the substage apparatus and their suitability for different purposes.—W.O.F.

ELECTRICITY SUPPLY

Load Shedding Protest. Lyme Regis Fire.

Bermondsey.—LOAD SHEDDING PROTEST.—The Borough Council is protesting to the Central Electricity Board against "discrimination" between electricity undertakings in S.E. England and the rest of Britain in the load-shedding scheme for the winter. An Electricity Committee report said that London and S.E. England were given a target of 70 per cent of the anticipated peak demand compared with 80 per cent elsewhere. The Council's undertaking was predominantly an industrial one.

POWER STATION PLAN OPPOSED.—The Council is to oppose proposals by the Central Electricity Board to erect a power station at Redriff Road, Rotherhithe. Councillor R. E. Goodwin, leader of the Council, told members that the proposals would involve the displacement of numbers of families living in comparatively new Council flats. A resolution is to be sent to the C.E.B. supporting proposals to build a power station—even in Bermondsey—but suggesting that there are other sites which would cause much less inconvenience.

Cardiff.—SUPPLY EXTENSIONS.—The Corporation is to supply electricity to a factory in Penarth Road (£460) and to permanent houses on the Ely Racecourse (£10,778); and lay a 6·6-kV feeder from Sanatorium Road to Cowbridge Road (£1,264).

Craven Dales.—SPECIAL ORDER REFUSED.—The Ministry of Fuel and Power has refused to confirm the Cracoe, Hebden and District Special Order authorizing the Electrical Distribution of Yorkshire, Ltd., to proceed with a scheme to supply electricity to several townships in the Craven Dales. The Ministry states that, even assuming the Order received early confirmation, it would not be possible for the matter to be dealt with in Parliament until next Session, and it seems doubtful whether subordinate legislation to achieve in one small part of the country what is already provided for on a national basis in the 1947 Act would commend itself at this stage. Steps have been taken to ensure that the appropriate Area Board, when set up, shall be aware of the position.

Eccles.—DISCOUNT REDUCED.—The discount for prompt payment of accounts has been reduced from 5 to 2½ per cent.

Edinburgh.—CONTRACTS FOR PORTOBELLO EXTENSION.—The Public Utilities Committee has accepted tenders amounting to £204,359 for concrete constructional work and the building of a new switch house in connection with the extension of the Portobello power station.

Islington.—CONSUMERS' SERVICE.—Reorganization of the advisory and inspection sub-section of the consumers' service section, has been approved by the Borough Council. Various adaptations to the showrooms proposed include the setting up of the enquiry bureau near the records office and the provision of facilities for the showing of films.

Leeds.—MINIMIZING GRIT EMISSION. — The city electrical engineer is to submit proposals for the reduction of grit emission from Kirkstall power station.

London.—J.E.A. EXPENDITURE.—The Finance Committee of the London and Home Counties J.E.A. has approved estimates from the Local Distribution Committee for mains and services (£60,070), purchase of two properties (£3,900), erection of a substation at Portsmouth Road, Esher (£6,500) and pilot cable (£2,192). The Electricity Commissioners have sanctioned the borrowing of £15,000 for substations and equipment and £9,910 for motor transport vehicles.

Lyme Regis.—POWER STATION FIRE. — On Tuesday evening last week a fire broke out at the generating station of the Corporation causing a breakdown in the electricity supply. Mr. W. E. Bradford, the borough electrical engineer, informs us that the fire commenced just after 10 p.m. The station was unattended at the time and the only plant running was a 250-kW motor-convertor supplying the d.c. load. A conversion from d.c. to a.c. is being carried out and so far a third of the town has been changed over. The a.c. supply was restored by 2.30 a.m. on the following day and during that day the supply to the d.c. consumers was restored by connecting an a.c. supply to the d.c. mains. This, of course, means that although consumers have electricity for lighting and cooking, no d.c.-only apparatus can be used. It is hoped that the d.c. supply will be restored in about three weeks' time.

Manchester.—ELECTRICAL DEVELOPMENTS.—The Corporation Electricity Committee proposes to lay a 33-kV underground cable from the Stretford and District Electricity Board's Irlam substation to the Carrington generating station at a cost of £20,826. On account of rising costs, the Committee's portion of he expenditure on constructing a conveyort system between Bradford colliery and Stuart Street power station is now estimated at £65,790, which is £13,090 more than anticipated last December.

METERS AND SERVICES.—Application is to be made for sanction to borrow £20,000 for meters and £30,000 for services, mainly for new houses.

Northern Ireland.—FARMERS CRITICIZE WHIT PAPER.—The Ulster Farmers' Union, in a lette to local authorities, regrets that the Electricit Board and the Belfast and Londonderry under takings are not to be amalgamated, but only

co-ordinated, under the scheme outlined in the recent White Paper. The U.F.U. considers that this will not bring about widespread development in rural areas, or equality of price in town and country.

Nottingham.—STREET LIGHTING CONVERSION.—At a meeting of the Lighting Committee the chairman (Councillor J. Willbery) stated that the lighting in further streets was to be changed from gas to electricity, namely Clumber Street, Bridlesmith Gate, St. Peter's Gate and Canal Street. He reported a reduction in the amount of damage to lamps, saying that the publicity given to the matter was ap parently bearing fruit.

Spenborough. — DISTRIBUTION WORKS. — The Town Council has received sanction to borrow £7,480 for substation equipment. Application is being made for sanction to the borrowing of £1,650 for the supply of electricity to the Whitechapel Lane housing estate, Scholes.

Stepney.—INCREASED CHARGES OR DEFICIT?—Instead of a surplus of £37,786, the Borough Council electricity undertaking is likely to show a deficiency of £22,000, says a report of the Finance and Parliamentary Committee to be presented to the Borough Council. The Committee had considered increasing basic charges by 25 per cent, making a total of 50 per cent over the pre-war rate, and raising the "unit" charge rate of the two-part domestic tariff from ¾d. to 1d. Then it was argued that the new Electricity Board for the London area under nationalization would surely take over liabilities as well as assets. It was decided to take counsel's opinion on the matter, and let the Council decide on action after receiving it.

Electricity Sales in 1946-47

Commissioners' Advance Statistics

PARTICULARS have been published by the Electricity Commissioners in advance of their annual report of the sales of electricity for various purposes during 1946-47. As regards public authority undertakings the period covered is the year ended March 31st in England and May 15th in Scotland. The figures for companies, joint electricity authorities and the Central Electricity Board relate to the calendar year.

A. PUBLIC AUTHORITY UNDERTAKINGS (EXCLUDING C.E.B. BUT INCLUDING JOINT AUTHORITIES)

Class of Supply	1946-47			1945-46		
	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)
Lighting, heating and cooking	10,571·6	49·9	1·269	8,387·7	44·5	1·365
Power	9,871·7	46·5	0·878	9,752·2	51·7	0·860
Public lighting	173·5	0·8	1·198	168·6	0·9	1·198
Traction	586·7	2·8	0·958	547·0	2·9	0·941
TOTALS	21,203·5	100·0	1·078	18,855·5	100·0	1·090

B. COMPANY UNDERTAKINGS

Class of Supply	1946			1945		
	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)
Lighting, heating and cooking	4,938·0	36·4	1·727	3,936·9	31·3	1·863
Power	8,037·1	59·3	0·893	8,134·2	64·7	0·889
Public lighting	57·2	0·4	1·848	31·1	0·3	1·937
Traction	529.5	3·9	0·764	468·0	3·7	0·762
TOTALS	13,561·8	100·0	1·196	12,570·2	100·0	1·192

C. ALL AUTHORISED UNDERTAKINGS (INCLUDING C.E.B.)

Class of Supply	1946-47			1945-46		
	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)	kWh sold (millions)	Percentage of Total	Average revenue per kWh (pence)
Lighting, heating and cooking	15,509·6	44·3	1·415	12,324·6	39·0	1·524
Power	17,908·8	51·1	0·885	17,886·4	56·5	0·873
Public lighting	230·7	0·7	1·359	199·7	0·6	1·313
Traction	1,369·4	3·9	0·849	1,246·7	3·9	0·839
TOTALS	35,018·5	100·0	1·121	31,657·4	100·0	1·128

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Murex, Ltd.—Referring to export trade in his statement submitted at the annual meeting last week the chairman, Mr. G. P. Joseph, said that the value of orders received for the products of the parent company was three times as much as in the previous year. This was directly attributable to the decision of the directors, in the closing stages of the war, to build up a strong export organization, which was now complete. Export sales of welding plants by Murex Welding Processes, Ltd., had substantially increased, but exports of electrodes showed a small decrease. Owing to the shortage of steel supplies it was not possible to satisfy more than a fraction of the demands for electrodes. Taking into consideration the much enhanced value of steel when exported in this form, the failure to allocate sufficient steel for this purpose did not appear to be in the national interest. After referring to research and development, the chairman said that the employees had shown a real appreciation of the need for increased production. Besides the usual staff cash bonus, a special bonus had been distributed to hourly-paid employees in recognition of their successful efforts.

The Nigerian Electric Supply Corporation, Ltd., held its annual meeting on October 28th, Major E. Seaborn Marks (chairman and managing director) presiding. In his statement the chairman said that the accounts for the year ended February 28th last reflect the return by their clients to economic mining since the termination of the "cost-plus" agreement between the mines and the Ministry of Supply, and the fixing of the price of tin. There was an anticipated fall in revenue, but the final picture is considered by no means unsatisfactory as a result of the favourable position created by the liquidation of the first mortgage debenture stock. During the year under review 44·6 million kWh was generated at the three power stations, a decrease of 25 per cent on the previous year. Inquiries from additional mining companies have been received but it is expected that the necessary system extensions will not be completed for about two years owing to the long delay in delivery of plant.

The Delhi Electric Supply & Traction Co., Ltd., reports a net revenue for the fourteen months to March 1st last of £87,407, as compared with £90,510 for the year 1945, and after including miscellaneous income and deducting administration expenses, etc., there is a balance of £81,662, to which is added £27,404 brought in, making £109,066. Tax reserve receives £60,000, and as already announced the dividend for the fourteen months is 9 per cent, tax free, leaving a balance to surplus account of £31,066. The report states that the company ceased to trade on March 2nd, 1947, when the undertaking was transferred to the Delhi Provincial Government. Balances credited to reserve accounts have been transferred to surplus account.

Radio & Television Trust, Ltd. (formerly the Philco Radio & Television Corpn. of Great Britain, Ltd.).—Consideration of the payment of interest on the sinking fund certificates and of the dividend on the preference stock in respect of the half-year to September 30th last is being deferred. Similar action was taken regarding the half-year to March 31st. Owing to a low home quota and restricted export markets the directors have decided to reduce considerably the radio part of the organization, but the home and overseas selling organization will be maintained. It is expected that the accounts to March 31st will be published before the end of the calendar year, when the directors' final decision regarding the preference dividend service will be made known.

Falk, Stadelmann & Co., Ltd., report a trading profit for the year ended March 31st last of £239,708, as compared with £158,874 for the preceding year, and a net profit of £151,770 (against £94,003). After placing £35,000 to contingencies reserve, it is proposed to pay a bonus of 5 per cent on the ordinary shares, making with the interim dividend 15 per cent, less tax, for the year (against 10 per cent). Pensions fund receives £5,000 and the balance carried forward is £51,013 (against £53,303 brought in).

Crabtree Electrical Industries, Ltd., has announced a final dividend of 12½ per cent (which includes a bonus of 7½ per cent), making 17½ per cent for the year (unchanged). The operating company shows a trading profit of £239,372 (against £246,442) and a net profit of £111,630 (against £107,178).

Richard Johnson & Nephew, Ltd., have declared an interim ordinary dividend of 5 per cent, less tax (against 3½ per cent). The directors state that the increased interim dividend should not be taken as an indication that there will be an increase in the total dividend for the year.

Morphy-Richards, Ltd., propose to pay an ordinary dividend of 160 per cent, as foreshadowed when the company was made public last May. The net profit for the year was £130,354 (against £37,400).

Eastern Telegraph Co., Ltd.—At an extraordinary meeting held last week approval was given to the immediate payment of a special ordinary dividend of 100 per cent, tax free. Cable & Wireless (Holding), Ltd., holders of some 99·8 per cent of the ordinary stock in the

company, have undertaken to repay such sum, if any, as might ultimately be held to have been improperly paid out of reserves.

Lightalloys, Ltd., reports a profit and transfer fees to June 29th last of £9,183, as compared with £19,091 for the previous year, and after deducting directors' fees and depreciation there is a balance of £1,195 (against £11,336), to which is added estimated E.P.T. recoverable, £15,000, and balance of E.P.T. recoverable in respect of 1945-46 of £3,287. Taxation requires £7,500 and it is proposed to pay a final dividend of 10 per cent (against 12½ per cent), making 15 per cent for the year (against 20 per cent). The balance carried forward is £22,851 (against £20,769 brought in).

The Victoria Falls & Transvaal Power Co., Ltd., reports a net profit for 1946 of £600,275 (compared with £582,050 for the preceding year) after deducting £1,804,661 (£1,373,871) for depreciation, amounts written off, U.K. taxation, and contingencies. Reserve receives £150,000 (same) and, as already announced, a final dividend of 15 per cent is being paid, making 19½ per cent for the year (against 19 per cent); this leaves £423,940 (£351,790) to be carried forward.

J. & F. Stone Lighting & Radio, Ltd., with a final dividend of 30 per cent, is maintaining the year's distribution at 40 per cent. The profit for the year ended June 30th last, before tax, amounted to £283,800 (against £265,669).

The Jerusalem Electric & Public Service Corporation, Ltd., is maintaining its dividend at 6 per cent for the year.

Pinchin, Johnson & Co., Ltd., have declared an interim dividend of 7½ per cent (against 5 per cent).

Ransomes & Rapier, Ltd., are maintaining their interim ordinary dividend at 2 per cent, tax free.

Broadcast Relay Service, Ltd., is increasing its interim dividend from 5 to 8 per cent, tax free.

The Anglo-Portuguese Telephone Co., Ltd., is maintaining its interim dividend at 3 per cent.

G. & J. Weir, Ltd., are again paying an interim dividend of 10 per cent.

New Companies

John Wilkie, Ltd.—Registered October 4th. Capital, £200. Manufacturers and repairers of, and dealers in, electrical accumulators, batteries, acids and containers, dynamos, wireless transmitting and receiving sets, etc. Directors: J. W. Wilkie and Constance H. Stevenson. Regd. office: 46, Upcerne Road, Chelsea, S.W.10.

U.V. Developments, Ltd.—Registered October 7th. Capital, £100. To develop commercially methods of fluorescent floodlighting. Directors: E. Hurwitz and H. A. Reeves. Regd. office: 62, Goodge Street, W.1.

Hampshire Refrigeration, Ltd.—Registered September 27th. Capital, £5,000 Distributors, manufacturers and repairers of, and dealers in, refrigerators, catering equipment, electrical apparatus, etc. Directors: P. G. Young, Elsa M. Young, and G. A. Bockett-Pugh. Regd. office: 108, High Street, Winchester.

B.V.C. Electronic Developments, Ltd.—Registered October 22nd. Capital, £5,000. Directors: J. J. Hambridge, D. Watkins (joint managing directors of British Vacuum Cleaner & Engineering Co., Ltd.) and G. Briggs. Regd. office: 3, Great Winchester Street, E.C.2.

Winding-up Petition

Bowmac Electric, Ltd.—A petition for the winding-up of the company is to be heard at the Royal Courts of Justice on November 10th. Persons wishing to appear on the hearing should write to Messrs. Biddle, Thorne, Welsford & Barnes, 1, Gresham Street, E.C.2, by November 8th.

Winding-up Order

Barlite, Ltd., 13, Elizabeth Street, Blackpool.—An order for the winding-up of the company was made on October 20th.

Increases of Capital

Whitworth Electric Lamp Co., Ltd.—Capital increased by £10,000 beyond the registered capital of £5,000.

Hawnt & Co., Ltd.—Increased by £8,000, beyond the registered capital of £2,000.

Bankruptcies

A. Lawson, formerly Abraham Lotterman, 261, Park West, Edgware Road, London, W.1, electrical engineer.—This debtor applied for his discharge at the London Bankruptcy Court on October 28th, when the Official Receiver reported that the Receiving Order was made on April 24th, 1941. The liabilities amounted to £88 and no assets were disclosed. The discharge was granted subject to a suspension of one month.

P. Burns, electrician, 21, Pandora Road, Hampstead, London.—Receiving order made October 24th on a creditor's petition.

Liquidations

J. Jones Electrical Installations, Ltd.—Winding up voluntarily. Liquidator, Mr. S. G. Hunt, 1, St. Michael's Street, Oxford, to whom claims should be sent by November 20th.

Hollinwood Electric Light & Power Co., Ltd.—Meeting pursuant to Section 236 of the Companies Act, 1929, on December 3rd at 1, Sixth Avenue, Limeside Estate, Hollinwood, Oldham, to receive the account of the winding-up by the liquidator, Mr. S. L. Stapleton.

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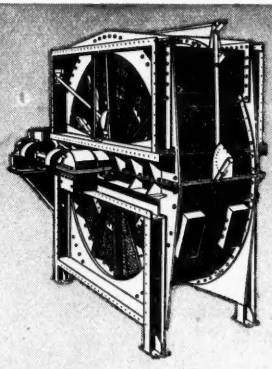

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STOCKS AND SHARES

AWAITING the advent of the new Budget, Stock Exchange markets are taking matters quietly. It is many months since business in some of the ordinarily active departments was as slender as it is to-day. For this, the uncertainty surrounding the Government's intentions is, of course, responsible, while the gravity of the economic crisis and the continued shortages of coal, steel and other essentials, throw a restraint upon enterprise in many directions. Stock Exchange prices keep steady. Gilt-edged issues are in particular demand, and this has the effect of maintaining quotations of front-rank ordinary and preference shares.

Company Results

Falk Stadelmann have followed up the 10 per cent interim dividend paid in August, with a bonus of 5 per cent, for the year ended last March, on the £577,500 ordinary capital. The total of 15 per cent compares with the two previous payments of 10 per cent and is the best distribution for many years. At 44s. cum dividend the £1 shares yield £4 11s. per cent on the dividend, or £6 16s. per cent with the addition of the bonus. Rothermel Corporation, having raised its dividend for 1946 from 22½ to 35 per cent, has lately increased this year's interim from 12½ to 17½ per cent. The last accounts showed the company to have been a heavy E.P.T. payer. The 1s. shares stand at about 5s. 9d. Morphy-Richards, in which A. Reyrolle & Co. hold a substantial interest, has declared a dividend of 160 per cent on its 1s. ordinary shares. Of these 150,000 were offered last May by Robert Benson & Co. at 25s. Shares changed hands at 17s. 6d. on October 13th. The price hardened to 20s. on the dividend announcement.

The Week's Changes

Electrical equipment shares have given, this week, a fair imitation of the stolid behaviour of electricity issues, which are again mostly unchanged apart from sixpenny gains in two or three cases. A half-crown rise in Christy Bros., to 77s. 6d., is one of the few movements worthy of comment. E.M.I. are steady at 17s. 3d., but Cossors, 18s. 6d., and E. K. Coles, 18s., are dull, while Radio & Television Trust were marked down to 4s. 3d. on the report that preference and funding interest payments, due on November 1st, are to be postponed until the full accounts are available. Associated Electricals at 75s. 9d. are the pence higher. English Electrics, 52s. 6d., and Ever Ready, 33s., are both rather easier. Parmiter, Hope & Sugden 1s., shares, introduced a year ago at about 4s. 6d., have been a better market lately, at 5s., on consideration of the 6 per cent yield. Tube Investments have gone back to 5¾, and Greenwood & Batley to 43s. 3d. In the overseas group, Palestine Electrics have lost further ground to 31s. 9d.

The Cable & Wireless stocks advanced to 124½ and 175½ for preference and ordinary respectively, upon the decision to pay forthwith a 100 per cent tax free dividend upon Eastern Telegraph ordinary stock, of which 99·8 per cent is held by Cable & Wireless (Holding).

Crabtree Dividend

Crabtree Electrical Industries 10s. shares are quoted at 38s. 9d., ex the final distribution of 12½ per cent (including 7½ per cent bonus) declared last week. The price is about 10s. below this year's best. The yield, with the year's total of 17½ per cent, works out at £4 10s. 3d. per cent. Similar distributions have been made in each year since the registration of the holding company in 1936. Trading profit of the operating company is shown in the preliminary figures to be £7,000 lower at £239,000. The net figure comes out at £112,000, against £107,000 last year, when combined earnings were equal to nearly 30 per cent gross on the £600,000 ordinary capital. In front of this is £350,000 in 5 per cent preference shares, quoted at 25s. per share.

Atlas Electric

Atlas Electric, after improving to 15s., fell back to 13s. 6d. on the statement made at the meeting with regard to the ratification of the agreement with the Uruguayan Government to sell the company's Montevideo tramway undertaking. It had been thought that the transaction was practically concluded for settlement in a week or two; but, owing to the suspension of sterling convertibility, the final ratification is held up. It is reasonable, says the chairman, to assume that the latest difficulties will be overcome in time. Meanwhile, the prospect of a dividend on the ordinary shares has somewhat receded. There had been a surprising amount of speculative buying in advance of the meeting, and the subsequent fall in the price came about largely as a result of sales by disappointed previous purchasers.

New Preference and Old

The new Reyrolle 4 per cent preference shares, issued at 20s. 6d., are in the market now at 22s. (free of stamp) to yield £3 12s. 9d. per cent. Murex new 4 per cent stand about 6d. higher. In each case the company has reserved the right to redeem the shares, at 21s., after 1957. Murex will redeem any outstanding shares at 20s. in 1997. These two big issues have helped to some extent to meet the persistent demand for investments giving, with security of a high order, something better in the way of income than the yields of under 3 per cent on gilt-edged stocks. Plessey preference shares are at present on offer in the market, the senior 5½ per cent issue at 29s. 3d., yielding 3¾ per cent, and the 4½ per cents at 22s. 9d., paying 1s. under 4 per cent on the money. A 4 per cent return is to be obtained also from Ferranti " sevens " at 35s.

Next Week's Events

Monday, November 10th

NEWCASTLE-ON-TYNE.—Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. "Commercial Development of Electricity Supply as a Consumer Service," by C. T. Melling.

SHEFFIELD.—Metallurgical Club, West Street, 7.30 p.m. Junior Institution of Engineers (Sheffield and District Section). Presidential address. "The Engineering Industry—Past, Present and Future," by P. W. McGuire.

MANCHESTER.—College of Technology, 7.15 p.m. Society of Instrument Technology. "An Experimental Electrical Pressure Meter for Measurement of Furnace Roof Differential Pressures," by S. S. Carlisle.

Tuesday, November 11th

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. Discussion on "What Equipment is necessary for the Servicing and Testing of Electronic Devices" opened by Wing Commander P. Allerston.

LONDON.—E.L.M.A. Lighting Service Bureau, 2, Savoy Hill, W.C.2, 6 p.m. Illuminating Engineering Society. "The Design of Industrial Lighting Equipment," by F. Widnall.

CAMBRIDGE.—Cavendish Laboratory, 8.15 p.m. I.E.E. Cambridge Radio Group. "Pulse Communication," D. Cooke, A. J. Oxford, Z. Jelonek and E. Fitch.

LEEDS.—Corporation Electricity Department, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. "The British Grid System in Wartime," by J. Hacking and J. D. Peattie.

MANCHESTER. — Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Measurements Group. "The Application of Electrical Technique to the Service of some other Industries," by H. Cobden Turner and G. M. Tomlin.

STAFFORD.—County Technical College, 7 p.m. I.E.E. South Midland Students' Section. "Neon Lighting," by D. T. Thompson.

LEICESTER.—Electricity Offices, Charles Street, 6.45 p.m. Leicester Electrical Society. "Electrostatic Machines and Instruments Applied to Industry and Research," by C. R. A. Chadfield.

NEWCASTLE-ON-TYNE. — At Neville Hall, 6.30 p.m. Institution of Heating and Ventilating Engineers (North-East Coast Branch). "District Heating," by G. A. Rooley.

Wednesday, November 12th

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Transmission Section. "Standardization of Power Cables," by W. H. L. Lythgoe.

EDINBURGH.—Heriot-Watt College, 6 p.m. I.E.E. Scottish Centre. "Neutral Earthing of Three-Phase Systems with particular reference to Large Power Stations," by J. R. Mortlock and C. M. Dobson.

ABERDEEN.—Caledonian Hotel, 7.30 p.m. I.E.E. North-East Scotland Sub-Centre. "Industrial Applications of Electronic Techniques," by H. A. Thomas.

RUGBY.—Corporation Electricity Showrooms, 6.45 p.m. I.E.E. Rugby Sub-Centre. Faraday Lecture on "Electricity and Everyman," by Dr. P. Dunsheath.

BRISTOL.—Merchant Venturers' Technical College, 5 p.m. I.E.E. Western Centre. "Electrical Control of Dangerous Machinery and Processes," by W. Fordham Cooper.

BARNSLEY.—Mining and Technical College, 3 p.m. Association of Mining Electrical & Mechanical Engineers (Yorkshire North-West Branch). H.M. Electrical Inspector's Report, by G. M. Harvey.

NORTHAMPTON.—College of Technology, St. George's Avenue, 7.15 p.m. Northampton and District Electrical Association. "The Applications of Electricity in Chemical Work," by W. Siddall.

Thursday, November 13th

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Installations Section. "Electrical Aspects of Overhead Travelling Cranes," by G. V. Sadler.

LONDON.—35, Grosvenor Place, S.W.1, 7 p.m. Women's Engineering Society. Discussion on "Equality of Status," opened by Dame Caroline Haslett.

DUNDEE.—Royal Hotel, Union Street, 7 p.m. I.E.E. North-East Scotland Sub-Centre. Paper by H. A. Thomas.

TAUNTON.—Corporation Electricity Offices, 3 p.m. I.E.E. South-Western Sub-Centre. Report on "The Practical Training of Professional Electrical Engineers."

GLASGOW.—At the Institution of Engineers and Shipbuilders, 7.30 p.m. Scottish Engineering Students' Association. "The Electrical Resistance Wire Strain Gauge," by A. G. Hadjiapyrou.

Friday, November 14th

LONDON.—Grosvenor House, Park Lane, 8.30 p.m. Electrical Industries Benevolent Association. Annual Ball.

LONDON.—39, Victoria Street, S.W.1, 6.30 p.m. Junior Institution of Engineers. Annual general meeting.

NEWCASTLE-ON-TYNE.—Old Assembly Rooms, 8 p.m. I.E.E. North-Eastern Students' Section. Annual dance.

STOKE-ON-TRENT.—City Electricity Department, 7 p.m. Electrical Power Engineers' Association (Midland Technical Group). "Modern Methods of Boiler Control," by W. Szwander.

Saturday, November 15th

LONDON.—I.E.E. London Students' Section. Visit to the Central Control Room of the C.E.B.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

1941

ENGLISH Electric Co., Ltd., and P. L. Mardis.—" Ward-Leonard electric motor-control equipments." 3826. March 20th, 1941. (593402.)

General Electric Co., Ltd., and J. T. Caldwell. —" Means for minimizing secondary radiation in X-ray apparatus and methods for the manufacture thereof." 5253. April 23rd, 1941. (593352.)

Vererie Souchon-Neuvesel.—" Electric furnace for glass manufacture." 13595. October 23rd, 1940. (593513.)

1943

E. G. Budd Manufacturing Co.—" Resistance welding method and resistance welded article." 14274. July 27th, 1942. (593459.)

Brush Development Co.—" Piezo-electric transducers." 19820. June 4th, 1942. (593406.)

Western Electric Co., Inc.—" Electrical amplifier circuits for obtaining the sum of a plurality of voltages." 19941. May 1st, 1941. (593354.)

1944

Standard Telephones & Cables, Ltd.— " Electric pulse generating system." 3576. February 27th, 1943. (593461.) " Arrangements for transmitting and receiving short electric pulses." 13949. January 23rd, 1943. (593467.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).— " Electric remote control systems." 10444. May 31st, 1944. (593410.)

M. G. Dixon (Robertshaw Thermostat Co.).— " Temperature regulating devices for electric ovens and like cooking appliances." 12644. July 3rd, 1944. (593411.)

Sturtevant Engineering Co., Ltd., H. W. Wagner and M. Gueilikman.—" Electrostatic precipitators." 13607. July 17th, 1944. (593356.)

H. C. Mettler and L. Spencer.—" Low frequency mobile glow discharge system." 13611. July 17th, 1944. (593415.)

Marconi's Wireless Telegraph Co., Ltd.— " Super-regenerative receivers." 17544. June 25th, 1942. (593361.)

British Thomson-Houston Co., Ltd.—" Inorganic moulding compositions and products produced therefrom." 20267. October 20th, 1943. (Addition to 564263.) (593515.)

1945

J. Brennan.—" Circuits for electric discharge tubes." 138. January 2nd, 1945. (593517.)

Standard Telephones & Cables, Ltd., P. K. Chatterjea and L. W. Houghton.—" Thermionic time delay circuits for electric pulses." 309. January 3rd, 1945. (593482.)

Simplex Electric Co., Ltd., C. Lacy-Hulbert and A. V. Barton.—" Combined radiator and air convection heating appliances." 1767. January 23rd, 1945. (593365.)

General Electric Co., Ltd., and E. F. Foreman —" Clutches." 1976. January 24th, 1945. (593483.)

Westinghouse Brake & Signal Co., Ltd., and A. H. B. Walker.—" Automatic voltage regulating apparatus for a load circuit supplied through a rectifier from a source of alternating current." 2210. January 29th, 1945. (593484.)

Standard Telephones & Cables, Ltd., and E. Robinson.—" Variable electric condensers." 4173. February 19th, 1945. (593369.)

Thermega, Ltd., and S. A. Singleton.— " Thermostatic electric switches." 4250. February 20th, 1945. (593370.)

F. C. Williams.—" Time base circuit arrangements." 4418. February 21st, 1945. (593491.)

F. C. Heayberd & Co., Ltd., F. C. Heayberd and J. Krimholtz.—" Fine control of current and voltage in alternating current electric circuits." 4605. February 23rd, 1945. (593432.)

A. H. Stevens (Curtiss-Wright Corporation). —" Method of and apparatus for removing material, such as embedded electrically conducting material, from an electrically conducting structure." 6874. March 19th, 1945. (593433.)

Arc Manufacturing Co., Ltd., and R. G. Moffatt.—" Arc welding and high-frequency ionizers therefor." 6914. March 19th, 1945. (593495.)

E. Mackereth.—" Transformer case." 7648. March 27th, 1945. (593434.)

Cinema-Television, Ltd., and S. S. West.— " Apparatus for detecting and/or locating by electrical means masses of electrically conducting or magnetic material." 12612. May 18th, 1945. (Addition to 574808.) (593377.)

Automatic Telephone & Electric Co., Ltd., and P. N. Roseby.—" Electrical signalling systems and apparatus for use therein." 12679. May 19th, 1945. (593378.)

Revo Electric Co., Ltd., and A. E. Felton.— " Chokes for use in electrical circuits." 13212. May 26th, 1945. (593447.)

British Thomson-Houston Co., Ltd., and W. S. Graff-Baker.—" Thermionic valve voltage regulators." 13529/30. May 30th, 1945. (593385/6.)

T. W. Rowlands, E. W. Griffiths and W. W. Thomas.—" Methods of and means for regulating the d.c. output of grid-controlled a.c. rectifiers, for motor control or other purposes." 13596. May 30th, 1945. (593449.)

Varley Dry Accumulators, Ltd., L. Fuller and E. W. Sudlow.—" Secondary electric battery." 13678. May 31st, 1945. (593521.)

General Electric Co., Ltd., and W. R. Rose.—" Automatic switches for use in telephone or like systems." 13683. May 31st, 1945. (593523.)

Standard Telephones & Cables, Ltd., and W. L. Garfield.—" Electrical frequency measuring apparatus." 13686. May 31st, 1945. (593524.)

British Oxygen Co., Ltd. (E.M.F. Electric Co. Proprietary, Ltd.).—" Gripping means for cables or like elements." 13704. May 31st, 1945. (593526.)

British Thomson-Houston Co., Ltd.—" Dies for coating fibre-insulated wire." 13773. June 2nd, 1944. (593529.)

Pollopas Patents, Ltd., and L. E. W. Montrose-Oster.—" Electric remote selective control systems." 13777. June 1st, 1945. (Addition to 473242.) (593530.)

General Electric Co., Ltd., H. C. Turner and J. Chamberlain.—" Dry-plate electrical rectifiers." 13835. June 1st, 1945. (593295.)

N. E. Noble and J. Buckingham.—" Electrical cable junction boxes." 13837. June 1st, 1945. (593533.)

Plessey Co., Ltd., and R. S. Wood.—" Electrical distribution boards for obtaining different combinations of electrical connections." 13877. June 2nd, 1945. (593296.)

A. E. Solley and F. E. J. Girling.—" Echo-simulating device for use with radar equipment." 13928. June 2nd, 1945. (593539.)

C. Hook.—" Photo-electrically operated organs." 14036. June 4th, 1945. (593297.)

Metropolitan-Vickers Electrical Electrical Co., Ltd., and G. L. Woolnough.—" Electrical remote control systems." 14049. June 4th, 1945. (593550.)

Telephone Manufacturing Co., Ltd., and C. O. L. Ward.—" Electrical condensers." 14286. June 6th, 1945. (593560.)

Welding Rods, Ltd., and F. H. W. Haworth.—" Electrical connectors." 14671. June 9th, 1945. (593305.)

Metropolitan-Vickers Electrical Co., Ltd., and H. Rusby.—" Means for the air-cooling of electric motors." 14733. June 11th, 1945. (593306.)

F. Tench (Automatic Electric Laboratories, Inc.).—" Contact spring assemblies for electrical switching devices." 15059. June 14th, 1945. (593322.)

Birlec, Ltd., J. Harris and G. H. Shirley.—" High-frequency electric induction furnaces." 15066. June 14th, 1945. (593323.)

C. L. Cleburne and C. Terry.—" Circuit breakers or automatic switches." 15072. June 14th, 1945. (593325.)

A. H. Stevens (National Standard Co.).—" Apparatus for recording sound on wire." 15077. June 14th, 1945. (593326.)

Westinghouse Electric International Co.—" X-ray apparatus." 15103. June 15th, 1944. (593327.)

Plessey Co., Ltd.—" Magnetic circuit and coil arrangements for electric vibrators, relays, and the like." 15246. June 16th, 1944. (593336.)

United Insulator Co., Ltd., and C. M. White and A. A. Dudley.—" Electric condensers." 15272. June 15th, 1945. (593342.)

F. C. Thompson.—" Radar navigating apparatus." 18699. July 20th, 1945. (593510.)

Standard Telephones & Cables, Ltd.—" Interference reducing in electric pulse signalling systems." 18709. November 23rd, 1943. (593511.)

1946

General Electric Co., Ltd., W. F. Baker and I. J. Pickering.—" Electrode holders for use in arc welding." 4851. October 23rd, 1944. (Divided out of 592004.) (593350.)

1947

Sturtevant Engineering Co., Ltd., H. W. Wagner and M. Gueilikman.—" Electrostatic precipitators." 784. August 17th, 1945. (Divided out of 593356.) (593398.) " Electrostatic precipitators." 889. July 17th, 1944. (Divided out of 593356.) (593399.)

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered within a month from October 29th:—

ELECTROBOT. No. 648,745, Class 8. Electrical shaving instruments.—G. S. Kammer, 48, Albemarle Street, Piccadilly, London, W.1.

DURALITE (design). No. 646,743, Class 9. Electric batteries and accumulators (none being for medical purposes).—Duralite Batteries, Ltd., Gatley, Cheadle, Ches.

SWORD FISH (design). No. 650,150, Class 9. Electric welding apparatus and arc-cutting apparatus.—Under-Water Cutters, Ltd., Ormonde House, 26-27, St. James's Street, S.W.1.

BERMEX. No. 650,406, Class 9. Electric switch and fuse boxes.—B. & H. (Nottingham), Ltd., Commerce Chambers, Upper Parliament Street, Nottingham.

CONVETTE. No. 652,213, Class 9. Battery eliminator units.—Amplion (1932), Ltd., 230, Tottenham Court Road, London, W.1.

SPRINGBOK'S HEAD (design). No. 649,960 Class 11. Circular fluorescent tubes embodying decorative lighting fittings.—R. Gidley, trading as Springbok Engineering Products, 43, Westminster Road, Davyhulme, Manchester.

MORANA. No. 651,350, Class 11. Hair-drying appliances, and parts thereof included in Class 11.—Moore's (Sheffield), Ltd., 8 & 10, Granville Street, Sheffield, 2.

COFAB. No. 652,212, Class 11. Electric fires.—A. Constantine & Son, Ltd., 75, Holloway Road, Holloway, London, N.7.

SILENTIME (design). No. B650,269, Class 14. Electric clocks.—Anglo Time Corporation, Ltd., 29, Pall Mall, Manchester, 2.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Birkenhead.—Corporation Waterworks Committee. Electrically driven automatic pumping plant in duplicate; water engineer, 601, Borough Road.

Blackpool. — November 12th. Electricity Department. Five 400-kVA and one 300-kVA transformers. (October 31st.)

Edinburgh.—November 21st. City Council. Electric passenger/goods lift at Portobello power station (October 31st.)

Leeds.—December 3rd. Transport Committee. Electrically-operated engine testing dynamometer plant, suitable for omnibus engines. (See this issue.)

Manchester.—November 10th. Electricity Committee. 33-kV cable. (October 24th.)

November 10th. Waterworks Committee. One electrically driven submersible borehole pump. (October 31st.)

Portsmouth.—November 17th. Town Council. Two vertical spindle sewage pumps, with electric motors, automatic starter and incidental plant. City engineer, 1, Clarence Parade, Southsea.

Salford.—November 10th. City Council. Electric lighting installation at the Marlborough Road primary school. (October 24th.)

Southampton.—November 14th. Electricity Department. Refrigerators, vacuum cleaners and washing machines. (October 31st.)

Woolwich.—December 1st. Electricity Department. H.v. and m.v. cables, transformers and meters for the year ending December 31st, 1948. (October 31st.)

Worksop.—Electricity Department. E.h.v. and l.v. cables. (October 24th.)

Orders Placed

Brighton.—Electricity Committee. Recommended. Generating plant at the Southwick "B" power station (£1,292,128).—Richardsons, Westgarth & Co. Boiler plant (£1,592,650).—Babcock & Wilcox. 33-kV cable from Kemp Town to Rottingdean, and from Rottingdean to Withdean (£63,791).—Siemens Bros. Twenty 500-kVA transformers (£11,500).—Brush Electrical Engineering Co. Transformers in connection with the completion of the 33-kV ring main.—C. A. Parsons; Ferranti.

Kingston-on-Thames.—Corporation. Steam feed auxiliary and drain pipework, etc., in connection with new power station (£120,618).—Stewarts & Lloyds.

London.—L.C.C. Hospitals and Medical Services Committee. Accepted. Installation of automatic telephone systems. Bethnal Green Hospital (£834).—J. E. Swann & Co. Brook Hospital, Woolwich (£4,141).—T. Clarke & Co. Electric bed lift, St. George-in-the-East Hospital (£2,070).—Evans Lifts.

L.C.C. Housing and Public Health Committee. Accepted. Two passenger lifts, for dwellings in the Murphy Street (Lambeth) area (£2,694).—Express Lift Co. Electrical installations: Murphy Street area (£2,421).—L. G. Tate & Co. Tulse Hill estate (£3,077).—Ayr Engineering & Constructional Co. Honor Oak estate, Lewisham (£1,005). — Holmes & Larkinson.

L.C.C. Mental Hospitals Committee. Accepted. Hydro-extractors at three hospitals (£1,405).—Watson, Laidlaw & Co.

JOINT ELECTRICITY AUTHORITY. Accepted. Three 15,000-kVA transformers (£13,950 each) —Ferranti. 33-kV switchgear (£26,067).—Ferguson, Pailin.

Manchester.—Transport Committee. Accepted. Cap and cone insulators for overhead equipment.—A. Wiseman & Co.

Gas Committee. Accepted. Starters for telpher.—Brookhirst Switchgear.

South Shields.—Town Council. Accepted. Switchgear for Brigham and Cowans substation (£1,262).—Cooke & Ferguson.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Amble.—"Airey" houses (30), Links estate; H. S. Robson, U.D.C. surveyor.

Banbury.—Permanent houses (34), Bodicote, Cropredy and Milcombe; R.D.C. surveyor, Castle Wharf.

Barnard Castle.—Houses (24), Cockfield; F. Blenkinsopp, surveyor, 45, Galgate, Barnard Castle.

Barnsley.—Sewerage and sewage disposal works, Carlton; borough engineer, Town Hall.

Blackburn.—Houses (10), Clarendon Road and Laburnum Road; Northern Estates, Ltd. Houses (38), Deganwy Avenue; Excelsior Joinery Co., Ltd.

Bolton.—Crematorium, Overdale, Heaton; C. Herbert, borough engineer.

Chesterfield.—Extensions to works; Lamp Caps, Ltd., Sheffield Road.

Clitheroe. — Extensions, Saunder Raike Foundry, Chipping; G. Tweedy & Co., Ltd.

Colchester.—Factory, Cowdray Avenue; E. N. Mason & Sons, Ltd., Arclight Works.

Croxley Green.—Junior School, Little Green Lane, Herts C.C.; C. H. Aslin, county architect, Hertford.

Darlington. — Houses (66), Broadway; Cackett, Burns Dick & MacKellar, architects, 21, Ellison Place, Newcastle-on-Tyne.

Doncaster.—Church, Parkway South, for R.C. authorities; F. Flowitt, builder, 11, Northfield Road.

Durham.—First part of scheme for new Stockton Grammar Schools (£102,000); county school architect, 34, Old Elvet, Durham.

Gateshead.—Factory, Ninth Avenue, Team Valley Estate; J. R. Rutherford & Son, builders, Jesmond, Newcastle-on-Tyne.

Factory, Team Valley Estate, for the Darlington Engineering Co., Ltd.; Tait & Holmes, builders, Benwell Village, Newcastle-on-Tyne.

Hanworth.—Crematorium (£60,000) for the South West Middlesex Crematorium Board; Denman & Son, architects, 27, Queen's Road, Brighton.

Harrogate. — Houses (64), Knaresborough Road (£77,773); Harrogate Master Builders' Federation.

Howdon-on-Tyne.—Laboratories and offices for Cooksons Lead & Antimony Works, Ltd.; Edward M. Lawson, Barras Buildings, Newcastle-on-Tyne.

Hyde.—Primary School, Newton; E. M. Parkes, county architect, The Castle, Chester.

Ipswich.—New wing at King George V Memorial Home; L. Barefoot, architect, 3, Graham Road.

Kingsbury.—Extensions to factory, Geo. King & Co., Ltd.; Riley & Glanfield, 6, Raymond Buildings, Gray's Inn, W.C.1.

Liverpool.—Offices, Canada Dock, for L.M.S. Railway Co.; Holland & Hannen & Cubitts, contractors, Liverpool.

Middlesbrough.—Factory for MacNays, Ltd., Stockton Street, Middlesbrough.

Midhurst.—Secondary School for West Sussex C.C.; F. R. Steele, county architect, Chichester.

Newcastle-on-Tyne.—Additions to infectious diseases hospital for the City Council, including X-ray apparatus; city architect, 18, Cloth Market.

Northumberland.—Police station and court at Hexham; county architect, Newcastle-on-Tyne.

Oldham. — Extensions, Strinesdale Sanatorium; S. Taylor & Sons, builders, Greenwood Street.

Ormskirk.—Secondary school; Rev. R. B. Teeley, St. Anne's R.C. Church, Prescot Road.

Poplar.—Factory, Millwall, for Limehouse Sack Works, Ltd., Burdett Road; R. H. Radburn, 60a, High Street, Acton, W.3.

Ripponden.—Factory, Small Lees, for Pancreol, Ltd.; Jackson & Fox, architects, 1, Harrison Road, Halifax.

Rushden.—Factory and workshops, Wellingborough Road, for Norris & Son, Ltd., Higham Ferrers; Dickens Bros., builders, St. Crispin estate.

St. Albans.—Permanent houses (22), Shenley Lane (£26,158), for R.D.C.; W. Cotterill, builder, Acton Avenue, Appleton, Warrington.

Salford.—Factory for Pylon Rainwear Co., Bury New Road, Broughton.

Southport.—Factory, Norwood Road and Butts Lane; Joy-Robin, Ltd., 277a, Lord Street.

Stratford.—Extensions to works for Jenson & Nicholson, Ltd.; Ley, Colbeck & Partners, Palmerston House, Bishopsgate, E.C.2.

Torquay.—Laboratory at Old Woods Brick Works; Western Counties Brick Co., Ltd., 23, Market Street.

Tynemouth.—Development of the North Shields Fish Quay (£250,000); borough engineer, 19, Howard Street, North Shields.

Wallsend.—Government Offices; Ministry of Works, Newcastle-on-Tyne.

Widnes.—Extension of pithead baths at Cronton (£33,299), for Miners' Welfare Commission; J. Yearsley & Son, Ltd., builders, Fenton Street, St. Helens.

Eire's Increasing Electrical Imports

THE following table compiled from the recently issued official trade returns of Eire, shows the value of imports of electrical machinery and allied material during the first half of the current year as compared with the corresponding six months in 1946.

Class of Goods	Jan.–June 1946	Jan.–June 1947
	£	£
Electric motors	29,077	45,683
Electrical measuring instruments and apparatus	26,609	17,561
Other electrical machinery	120,573	237,825
Vacuum cleaners	22,663	68,329
Accumulators and parts (excluding radio)	18,105	17,380
Dry batteries and parts	6,829	10,428
Electric lamp bulbs	25,911	24,389
Electric fires, kettles, irons, etc.	26,740	74,222
Electric lighting accessories, fittings and parts	50,580	116,463
Electric cooking apparatus and parts	22,341	47,459
Electric wires and cables, insulated	166,871	128,631
Copper wires in coils	83,004	86,438
Telegraph and telephone apparatus	85,745	109,808
Radio receiving sets	46,164	44,108
Radio, other sorts	8,201	4,217
Radio valves	25,673	27,040
Other radio parts	47,055	77,511
Other electrical goods and apparatus	150,071	192,289
Totals	£962,212	£1,329,781